

EXHIBIT 11

Contains Highly Confidential AEO and Source Code Materials

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

GOOGLE LLC,

Plaintiff

v.

SONOS, INC.,

Defendant.

CASE NO. 3:20-cv-06754-WHA
Related to CASE NO. 3:21-cv-07559-WHA

**OPENING EXPERT REPORT OF DR. DAN SCHONFELD REGARDING CLAIM 1 OF
U.S. PATENT NO. 10,848,885**

Contains Highly Confidential AEO and Source Code Materials



GOOG-SONOSNDCA-00056782-73.

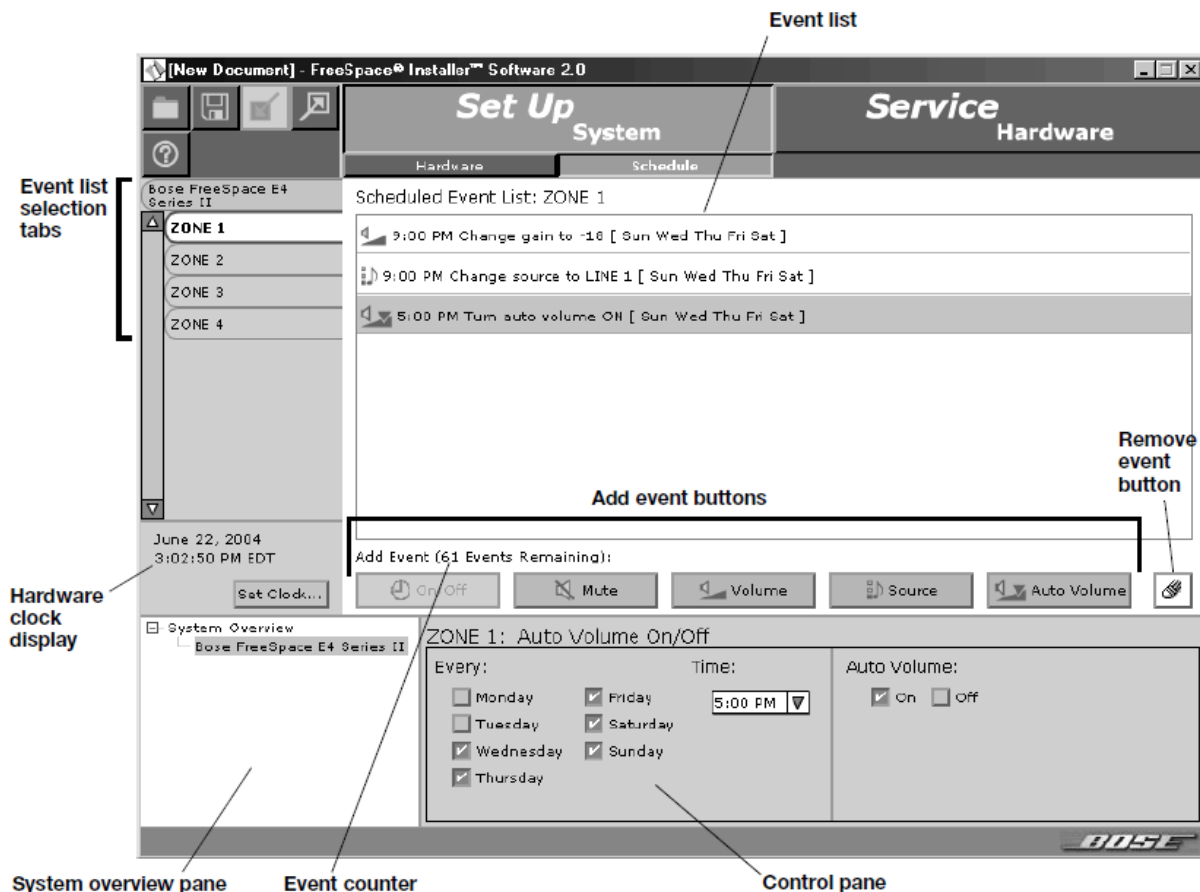
D. Bose

149. I understand that the Bose® FreeSpace® Owner’s Guide (the “FreeSpace Owner’s Guide”) bears a publication date of July 10, 2004, and was publicly available at least as of May 6, 2006, making it prior art under at least 35 U.S.C. § 102(a).

150. According to the FreeSpace Owner’s Guide publication, the FreeSpace® installer interface allowed the user to automate the system by creating scheduled events to control how

Contains Highly Confidential AEO and Source Code Materials

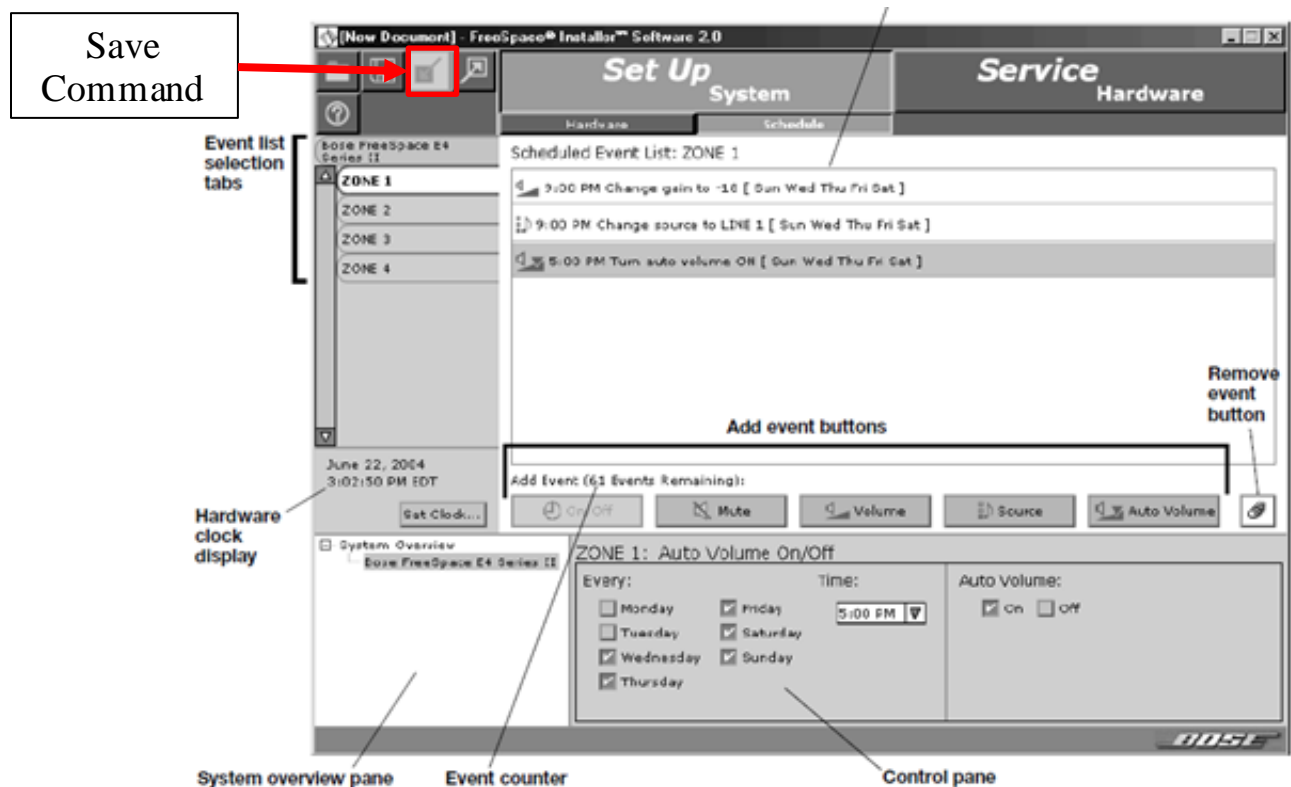
selected zones and subzones are invoked at predetermined times:



BOSE_SUB-0000056; BOSE_SUB-0000062 at -76, -100-103.

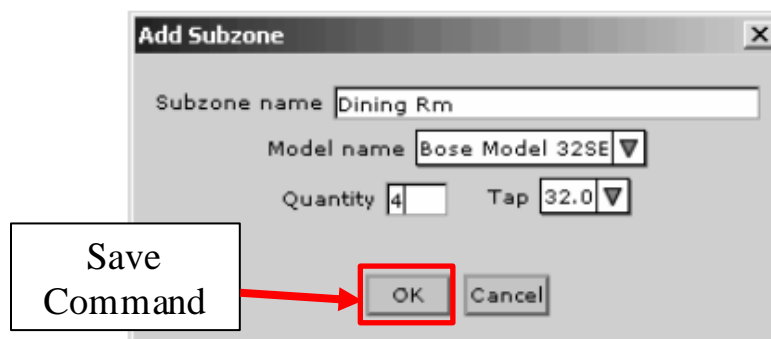
151. These events and particular subzone speaker groupings “are saved to the E4 unit” when a user clicks the save button, as shown in the following figures. BOSE_SUB-0000101.

Contains Highly Confidential AEO and Source Code Materials



Id. (annotated).

152. Additionally, a user can click “OK” after creating a subzone, as shown in the following figure, to add the subzone to the table (where it can later be edited or deleted, and thus is saved). BOSE_SUB-0000108.



BOSE_SUB-0000062 (dated 2004) at -107, -108, -110.

153. The FreeSpace Guide is analogous to the '885 patent because it is in the same field

Contains Highly Confidential AEO and Source Code Materials

of endeavor, “controlling or manipulating a plurality of multimedia players in a multi-zone system.” ’885 patent at 1:30-34. For example, the FreeSpace Guide, like the ’885 patent describes that the Bose “E4 system [that] has four amplifier output channels which can be configured for different zones” of speakers and manipulating the various zones of players by configuring “scheduled events” to activate playback according to particular settings at particular times. BOSE_SUB-0000074; -101; -105-107. Moreover, the FreeSpace Guide describes configuring “subzones” of speakers within each zone. *Id.*, -111-112. The FreeSpace Guide is also reasonably pertinent to the problem to be solved by the ’885 patent, “dynamic control of the audio players as a group.” For example, the FreeSpace Guide explains that a user can configure “scheduled events” that control the on/off status for a zone as well as a volume, source, and time/day of activation—or dynamic control of the groups of speakers. *Id.*

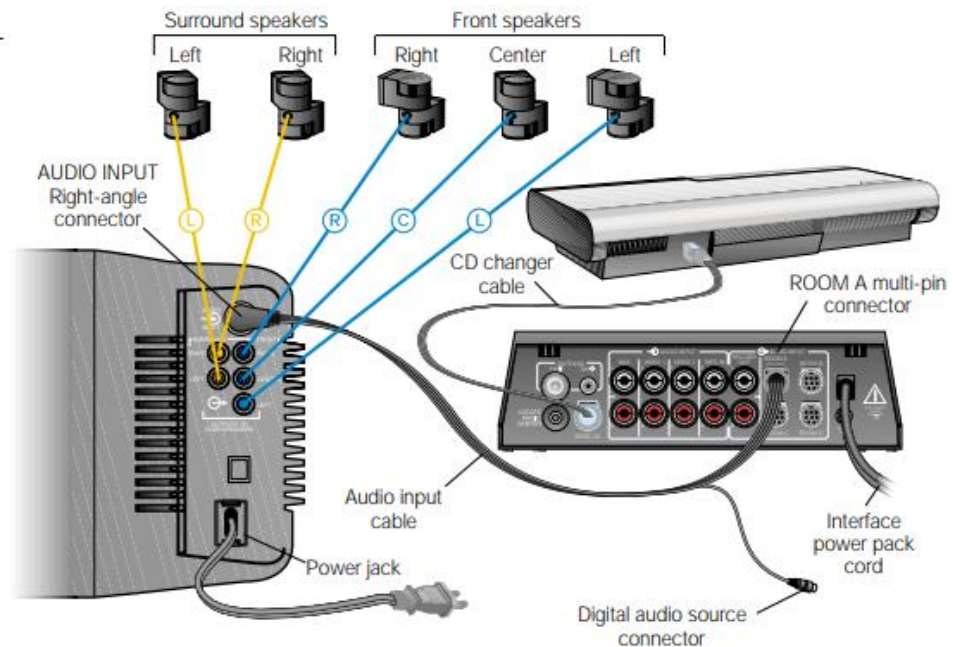
154. I understand that the Bose Lifestyle 50 System Owner’s Guide (the “Lifestyle 50 Guide”) bears a publication date of October 17, 2001, and was publicly available at least as of 2003, making it prior art under at least 35 U.S.C. § 102(a). BOSE_SUB-0000001; https://www.bose.com/en_us/support/products/bose_home_theater_support/bose_5_speaker_home_theater_support/ls50.html (noting that the Lifestyle 50 system was sold from 1970-2003); <http://www.audioreview.com/product/other/mini-systems/bose/lifestyle-50.html> (2003 reviews).

155. According to the Lifestyle Owner’s Guide, the product allowed a user to create a multi-room interface and direct digital audio to that interface:

Contains Highly Confidential AEO and Source Code Materials

Figure 8

Speakers, CD changer, and multi-room interface connections



BOSE_SUB-0000012.

156. The Lifestyle system includes a touch sensitive controller interface that allows the user to wake up the system as well as selecting sources of media. Available settings include adjusting the volume, muting the system, and using a sleep timer. BOSE_SUB-0000021.

Contains Highly Confidential AEO and Source Code Materials

Turning the system on

1. Touch the music center screen to wake up the display (Figure 18). The last display that you used appears on the screen.
2. Press ON/OFF to turn the system on to the last source used, or press a SOURCE button (FM, AM, CD, VIDEO 1, VIDEO 2, TAPE, AUX) to select and turn on that source (Figure 19).

Note: Initially, the AM and FM sources turn on in 2-speaker mode (front right and front left). All other sources initially turn on in 5-speaker mode. To change the speaker settings, see "Selecting the number of speakers" on page 22.

Figure 18

Waking up the display

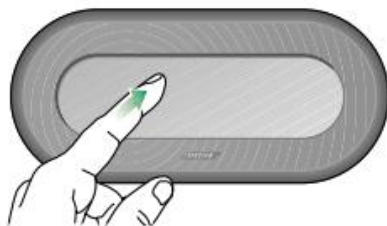


Figure 19

Turning on a source



BOSE_SUB-000020.

Using the Personal™ music center display

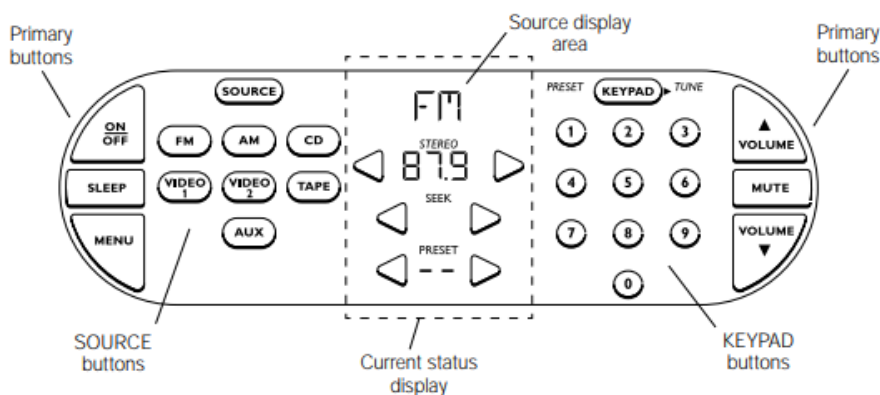
The music center display provides information on the system functions. The display offers different combinations of buttons to provide control of the function you are using. Sometimes an item on the display will flash to provide information about a system function. When an item flashes faster, it is alerting you to a needed action.

Using the primary buttons

The primary buttons (ON/OFF, SLEEP, MENU, VOLUME, and MUTE) are located at the left and right sides of the display.

Figure 21

The display showing the primary buttons, SOURCE buttons, and KEYPAD buttons



BOSE_SUB-0000022.

157. The system also includes presets, as shown below:

Contains Highly Confidential AEO and Source Code Materials

PRESETS

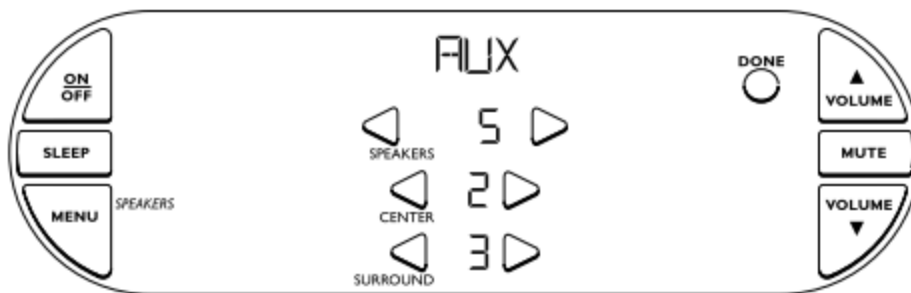
You can preset a maximum of 25 FM and 25 AM radio stations. In addition to using the *PRESETS* menu, you can set presets directly from the *KEYPAD* buttons. See pages 27-28.

BOSE_SUB-0000023.

158. The system also allows the user to select the number of speakers to control together as a group, such as 5 speakers or two speakers. “Speaker settings are remembered for source and room,” and those settings can include volume levels as well as center and surround sound settings:

Selecting the number of speakers

Initially, the AM and FM sources turn on in 2-speaker mode (front right and front left). All other sources initially turn on in 5-speaker mode. To change the speakers setting, press the *MENU* button until *SPEAKERS* is displayed (Figure 23). Use the ◀ or ▶ arrow buttons to change speaker mode from 5 to 3 or 2. Speaker settings are remembered for source and room.



Adjusting center and surround levels

The *SPEAKERS* selection display (Figure 23) also allows you to adjust the volume levels of the center and surround speakers. At the factory, these levels are set to zero. To adjust them, press the *MENU* button until *SPEAKERS* is displayed. Then use the ◀ or ▶ arrow buttons to adjust the levels.

- The *CENTER* level can be adjusted to soften or emphasize center speaker image.
- The *SURROUND* level can be adjusted to move the surround information forward in the room or further to the rear.

The system remembers the center and surround level settings for the room in which they were adjusted.

BOSE_SUB-0000024.

159. The Lifestyle system allows a user to output audio to at least four different “rooms” as shown below, which are identified as Room A, B, C, and D:

Contains Highly Confidential AEO and Source Code Materials

Connecting additional rooms

Follow the placement guidelines for the Bose® powered speakers that you plan to connect. Then review your plan for how to connect these speakers to the multi-room interface in your primary room. If you have questions or need extension cables to complete the connections, call Bose Customer Service at the numbers listed on the back inside cover of this owner's guide.



CAUTION: Make sure all components are unplugged from the power outlet before you begin hooking up additional speakers.

Connect the audio input cable from your additional powered speakers to the selected ROOM jack on the back of the multi-room interface.

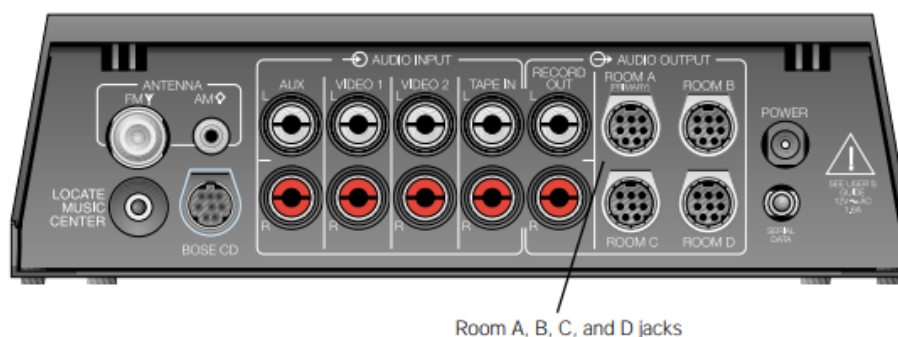
1. Plug the small black multi-pin connector (flat side facing up) into the jack marked ROOM B, C, or D on the back of the interface.
2. Follow the instructions that came with your speakers for connecting the cable to the speakers.



Note: Be sure that each connector is inserted completely into each jack.

Figure 47

ROOM jacks on the multi-room interface



BOSE_SUB-0000042.

160. The Lifestyle system describes controlling music among the four rooms, and the entire house, below. It allows controlling audio sources for up to four rooms. The Room button lets a user control a single room or two or more rooms sharing an audio source. The House button controls all of the connected rooms as one. The manual notes that an unboxed room shows that the room is sharing a source with the primary room, and any change of the audio playing will affect all rooms sharing the source.

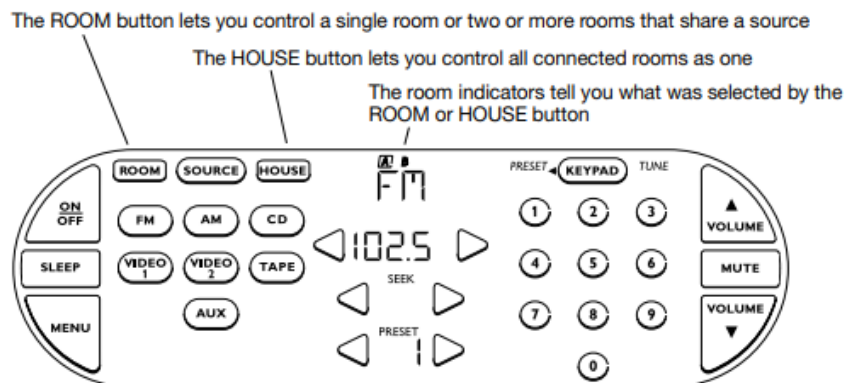
Contains Highly Confidential AEO and Source Code Materials

Operating in more than one room

Your Lifestyle® 50 system can control up to four sets of Bose® powered speakers, allowing your family to enjoy different audio sources (CD, radio, TV, etc.) in up to four rooms. These rooms are referred to as room A, B, C, and D, with room A being the primary room (the one used for a one-room system). If two or more rooms are connected to your system, the Personal™ music center displays ROOM and HOUSE buttons, and room indicators (A, B, C, and/or D). Figure 48 shows an example display for a two-room system.

Figure 48

Example display for a two-room system

**Understanding the room indicators**

- ☒ A boxed letter indicates the presently-selected room or rooms. The selected room is affected by any source changes, or any change you make using the VOLUME, MUTE, ON/OFF, or SLEEP buttons.
- ☐ An unboxed letter indicates a room listening to a **shared source**. A shared source is one that is playing in the controlled room as well as in up to three additional rooms. If you change the radio station, CD track, etc., of the shared source, the change affects all rooms sharing this source. However, you cannot change sources for all affected rooms at the same time. The VOLUME, MUTE, ON/OFF, and SLEEP buttons only affect the boxed room(s).
- ☐ An empty box appears for each connected room when you press the HOUSE button. When you change the volume in the HOUSE mode, the numerical level appearing on the display does not represent the actual volume level in all connected rooms. It only represents the actual volume in rooms represented by a boxed letter.

BOSE_SUB-0000043.

Contains Highly Confidential AEO and Source Code Materials

Using the ROOM button

The ROOM button allows you to select any connected room and control any sound source you want to hear in that room. Each time you press the ROOM button you can transfer control from one room to the next in A-B-C-D order. The room indicators on the display tell you what is currently selected. Rooms listening to a shared source can be linked and controlled as one room.

Turning on different sources in more than one room

Let's say you have a two-room system (rooms A and B) and the entire system is off. To turn on a different source in each room:

1. Wake up the Personal™ music center.
2. Press the ROOM button until the room indicator **[A]** is displayed. Press a source button, such as VIDEO 1, to turn on the system and listen to your DVD player in room A. Adjust the volume to the desired level.
3. Press the ROOM button again. The room indicator **[B]** is displayed. Press a different source button, such as CD, to listen to a CD in room B. Again, adjust the volume to the desired level.
4. Press the ROOM button again and notice that the room indicator **[A]** is displayed. You are controlling room A once again and the displays indicates that the VIDEO 1 source is on.

BOSE_SUB-0000044.

Contains Highly Confidential AEO and Source Code Materials

Setting up a shared source

Now, let's say the system is already on and you want to play the FM radio in rooms A and B:

1. Wake up the Personal music center.
2. Press the ROOM button until the room indicator **[A]** is displayed. Press the FM source button and adjust the volume to the desired level for room A.
3. Press the ROOM button again to select room **[B]**. Press the FM source button and adjust the volume to the desired level for room B. Now, the indicators **A [B]** are displayed.
4. Press the ROOM button again. The indicators **[A] [B]** appear on the display indicating that you can control these two rooms together. Any button command given now (SOURCE, VOLUME, MUTE, ON/OFF, SLEEP) is applied to both rooms.



Note: Remember that there are limits to using different sources in different rooms. With one tuner, the system cannot play one radio station in one room and another radio station in another. Similarly, with one CD changer, the system cannot play two different CDs at the same time.

Linking rooms for common control

There are two ways to link rooms in order to control them as one.

- Set up a shared source in two or more rooms and select them together using the ROOM button. See "Setting up a shared source" above.
- Link all connected rooms using the HOUSE button. See "Using the HOUSE button" on page 43.

Returning to single-room control

After you have gained control of multiple rooms using the ROOM button, you can use the ROOM button again to gain control of a single room. Press ROOM until the room you want is displayed (**[A]**, **[B]**, **[C]**, or **[D]**). Control that room as desired.


Id.

161. In House mode, the users presses the House button before each command to apply that command to all rooms, as described below:

Contains Highly Confidential AEO and Source Code Materials


Using the *HOUSE* button

Using the *HOUSE* button, you can link all rooms together and control them as one. When you press the *HOUSE* button, an empty box indicator is displayed for each connected room. Any button pressed after that (any source button, *VOLUME*, *MUTE*, or *SLEEP*) affects every room. When you are done listening you can press *OFF* to turn off the entire system.

 **Note:** *If you do not press any additional buttons after pressing *HOUSE*, pressing *HOUSE* again cancels *HOUSE* mode.*

Press the *HOUSE* button before each command to apply that command to all rooms:

Press ...	To do this ...
<i>HOUSE</i> then a source	Play the selected source in all connected rooms.
<i>HOUSE</i> then <i>VOLUME</i> ▲▼	Adjust the volume up or down by the same amount in all rooms that are on, or all connected rooms if they are all off. The system remembers the differences among the original room volume settings.
<i>HOUSE</i> then <i>MUTE</i>	Silence all connected rooms that are on, even if any were previously muted individually. To cancel this command, press <i>HOUSE</i> then <i>MUTE</i> again. Any rooms that were muted before this command was given stay silent until individually unmuted. If you unmute an individual room after it was muted by a <i>HOUSE</i> - <i>MUTE</i> command, the other rooms remain silent until each one is unmuted individually. Pressing <i>HOUSE</i> then <i>VOLUME</i> ▲ unmutes all muted rooms.
<i>HOUSE</i> then <i>SLEEP</i>	Set the <i>SLEEP</i> timer for all rooms that are on. The <i>SLEEP</i> time selected applies to all rooms that are on even if they are playing different sources. If the <i>SLEEP</i> timer was already set in one or more rooms, the display shows the longest time already set. You can accept this time or change it for all the rooms. To cancel the <i>HOUSE</i> - <i>SLEEP</i> command, press <i>HOUSE</i> , <i>SLEEP</i> , <i>CLEAR</i> , and then <i>DONE</i> .
<i>HOUSE</i> then <i>OFF</i>	Turn off the entire system.

 **Note:** *Instead of setting the whole house to one sleep time, you can set different sleep times for individual rooms by using the *ROOM* button to select each room and setting *SLEEP*. When two or more rooms are linked, adjusting the *SLEEP* time affects all linked rooms (indicated by boxed letters).*

BOSE_SUB-0000045.

162. The Lifestyle system can also be expanded by using more than one personal music center:

Contains Highly Confidential AEO and Source Code Materials

Using more than one Personal™ music center

If you have a multi-room system, you can add additional music centers for some or all of the connected rooms. Each multi-room interface can be controlled by a maximum of four music centers. Each music center can control up to four rooms.

To add a new music center to your system, follow the setup instructions on page 17. Be sure to install the batteries and turn it on for the first time close to the multi-room interface to allow the new music center to set up a radio frequency link with your system. If the multi-room interface is not plugged in or the music center is out of range, the display indicates *NO RESPONSE*.

Id.

163. The Lifestyle 50 system is analogous to the '885 patent because it is in the same field of endeavor, “controlling or manipulating a plurality of multimedia players in a multi-zone system.” '885 Patent, at 1:32-35. For example, the Lifestyle 50 system, like the '885 patent describes using different rooms or zones, as well as grouping all zones in the house together, for individual or group synchronous playback. The Lifestyle 50 system is also reasonably pertinent to the problem to be solved by the '885 patent, “dynamic control of the audio players as a group.”

E. Millington

164. I understand that Canadian Patent No. 2 533 852 (“Millington”) was published on February 10, 2005 making it prior art under at least 35 U.S.C. § 102(b).

165. Millington describes a networked audio system for synchronizing playback by one or more synchrony groups. Millington, Abstract; Fig. 1, 3, ¶2; 4, ¶1. Each synchrony group includes one or more zone players that play the same audio program synchronously. *Id.*, 6, ¶3. The networked audio system includes a user interface module for the user to dynamically establish and modify different synchrony groups. *Id.*, 7. The user interface module includes a display of status information, such as the name of the audio track currently being played, the names of upcoming tracks, the identifier of the zone player currently operating as the master device, and the identifiers of the zone players currently operating as slave devices. *Id.*, 11, ¶3.

Contains Highly Confidential AEO and Source Code Materials

(xi) *Limitation 1.10: “based on the instruction, transitioning from operating in the standalone mode to operating in accordance with the given one of the first and second predefined groupings of zone players such that the first zone player is configured to coordinate with at least one other zone player in the given one of the first and second predefined groupings of zone players over a data network in order to output media in synchrony with output of media by the at least one other zone player in the given one of the first and second predefined groupings of zone players.”*

616. In my opinion, Squeezebox discloses this claim limitation.

617. The evidence disclosing this claim limitation is described above, which transitions the Squeezebox or Softsqueeze player from playing (or not playing) independently of the group to play in accordance with the group. As described above, the Squeezeboxes coordinate through master and slave communication to output music in synchrony, and the strm/play messages cause the speaker to operate in accordance with the claimed “zone scene.”

618. Further, as described in the previous claim limitation, a user may select a synchronization group for playback using the Player selector box, and use the playback controls to cause the Squeezeboxes to operate as a synchronous playback group. At the time that the synchronization group is selected and media is output from the synchronization group, the Squeezeboxes discontinue their previous playback and begin playing back as part of the synchronization group.

C. Claim 1 Is Invalid Based On Bose Lifestyle in view of General knowledge of a POSITA, the Sonos PA System, the Sonos Forums, or Millington.

619. Bose Lifestyle 50 System (“Bose Lifestyle”) was publicly available, on sale,

Contains Highly Confidential AEO and Source Code Materials

offered for sale, and described in printed publications both before the critical date (i.e., prior to September 12, 2005), before the alleged conception date (i.e., prior to December 21, 2005), and prior to the patent filing date on September 12, 2006. The features offered in that system were substantially the same during each of those time frames, as discussed below.

620. The capabilities and features of the Bose Lifestyle are apparent from documents that Bose has made available to the public and produced in this case, the products themselves, technical documentation, public documentation regarding that system, professional and customer reviews, and other sources discussed below.

621. In my opinion, Claim 1 is rendered obvious based on the Bose Lifestyle in view of the general knowledge of a POSITA, the Sonos Forums, Nourse, Millington, and Rajapakse, as described below. Below, I analyze each element of Claim 1 and demonstrate why that claim is invalid.

(i) *Limitation 1 (preamble): "A first zone player comprising:"*

622. To the extent the preamble is limiting, Bose Lifestyle discloses the preamble in my opinion. For example, the Bose Lifestyle was publicly available no later than October 17, 2001. The Bose Lifestyle player corresponds to the claimed Zone Player and it provides the ability to stream digital music from a controller over a Wi-Fi or ethernet network. It can plug into any home theater stereo or speakers with digital and analog outputs, and allows a user to synchronize multiple players for whole house audio.

Contains Highly Confidential AEO and Source Code Materials

Thank you for purchasing the Bose® Lifestyle® 50 system. Years of research lie behind this complete audio home entertainment system – the most advanced home theater system from Bose. Technological innovations that make the Lifestyle® 50 system unique include the Bose Personal™ music center, which places all system operations in the palm of your hand, and tiny Jewel Cube® speakers.

The interactive Personal music center is a clear departure from convention, communicating with the system through a two-way radio data link. The result for you is full control of this entertainment system as you move about your home.

The Bose Jewel Cube speakers are also far from conventional. Proprietary technologies ensure that these tiny speakers not only fill a room with sound, but also reproduce it more accurately than traditionally designed loudspeakers.

The other elements of the Lifestyle® 50 system are designed to be hidden from view:

- The elegant Lifestyle® CD changer, designed to give you flexibility in where it is placed
- The hideaway powered Acoustimass® module that delivers the rich, full, lifelike bass
- The Bose multi-room interface, with four independent audio outputs that allow you to enjoy Bose sound throughout your home.

BOSE_SUB_0000006.

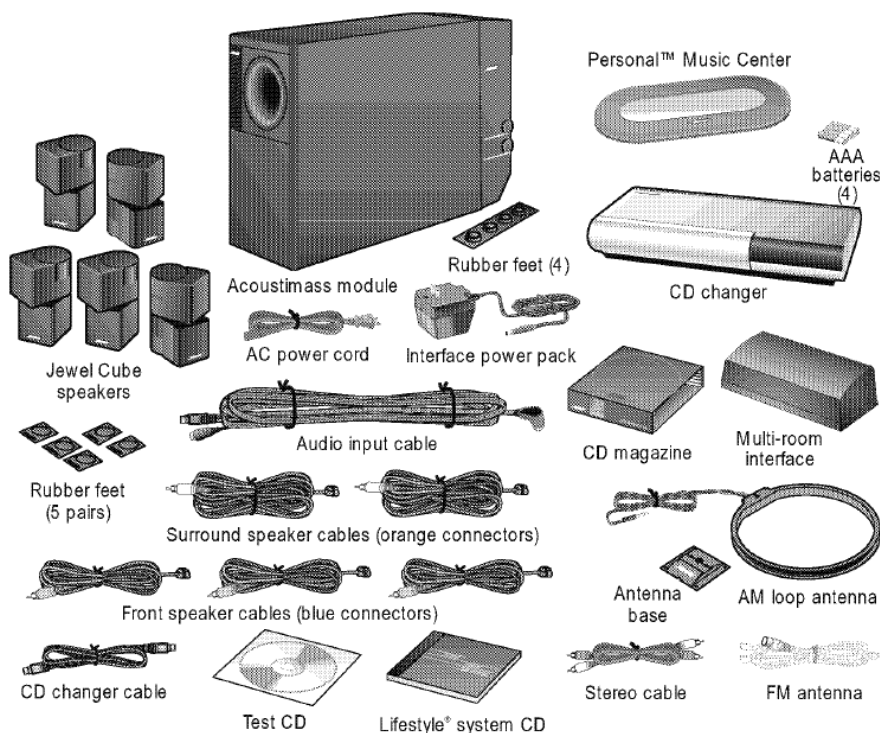
623. As shown below, the Bose Lifestyles connects the controller (for example a computer) and a speaker system.

Contains Highly Confidential AEO and Source Code Materials

Figure 1

What comes with your Lifestyle® 50 system:

- Personal music center
- CD changer
- Multi-room interface
- Interface power pack*
- 5 Jewel Cube® speakers
- 5 speaker cables
- Acoustimass module
- AC power (mains) cord*
- 14 self-adhesive rubber feet (4 for the module and 5 pairs for the Jewel Cube speakers)
- Audio input cable
- CD changer cable
- Stereo cable
- 4 AAA batteries
- FM antenna
- AM loop antenna
- AM antenna base
- CD magazine
- Lifestyle® system CD
- Test CD



* Power cord and pack shown above are USA/Canada/Japan versions.
Dual voltage systems include 1 power cord, 1 adapter, and 2 power packs.
The power cords and packs for Europe, UK/Singapore, and Australia are shown below.



Id.

624. Further, the Bose LifeStyle allows a user to select a location for the multi-room interface.

Figure 5

The multi-room interface

**Multi-room interface**

Select a location for the multi-room interface. It may be placed out of sight if you like.

1. Place the multi-room interface within 30 feet (9.1 m) of the Acoustimass module (the length of the audio input cable).
2. Place the multi-room interface close enough to the sound sources (TV, VCR, DVD, etc.) to allow for cable length. If you need additional audio and/or video cables to connect all of your components, see your dealer or call Bose® Customer Service.

BOSE_SUB_00000010.

Contains Highly Confidential AEO and Source Code Materials

Operating a Multi-Room Lifestyle® 50 System**Connecting additional rooms**

Follow the placement guidelines for the Bose® powered speakers that you plan to connect. Then review your plan for how to connect these speakers to the multi-room interface in your primary room. If you have questions or need extension cables to complete the connections, call Bose Customer Service at the numbers listed on the back inside cover of this owner's guide.

CAUTION: Make sure all components are unplugged from the power outlet before you begin hooking up additional speakers.

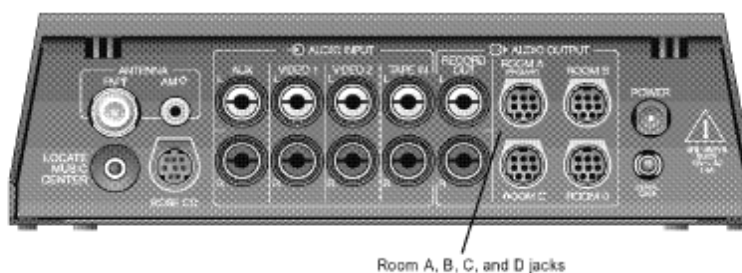
Connect the audio input cable from your additional powered speakers to the selected ROOM jack on the back of the multi-room interface.

1. Plug the small black multi-pin connector (flat side facing up) into the jack marked ROOM B, C, or D on the back of the interface.
2. Follow the instructions that came with your speakers for connecting the cable to the speakers.

Note: Be sure that each connector is inserted completely into each jack.

Figure 47

ROOM jacks on the multi-room interface



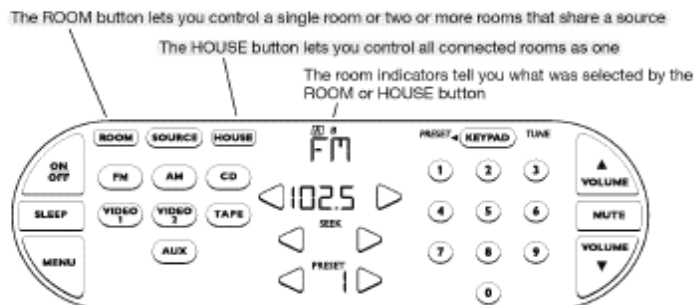
Contains Highly Confidential AEO and Source Code Materials

Operating a Multi-Room Lifestyle® 50 System**Operating in more than one room**

Your Lifestyle® 50 system can control up to four sets of Bose® powered speakers, allowing your family to enjoy different audio sources (CD, radio, TV, etc.) in up to four rooms. These rooms are referred to as room A, B, C, and D, with room A being the primary room (the one used for a one-room system). If two or more rooms are connected to your system, the Personal™ music center displays ROOM and HOUSE buttons, and room indicators (A, B, C, and/or D). Figure 48 shows an example display for a two-room system.

Figure 48

Example display for a two-room system

**Understanding the room indicators**

- ☒ A boxed letter indicates the presently-selected room or rooms. The selected room is affected by any source changes, or any change you make using the VOLUME, MUTE, ON/OFF, or SLEEP buttons.
- ☐ An unboxed letter indicates a room listening to a **shared source**. A shared source is one that is playing in the controlled room as well as in up to three additional rooms. If you change the radio station, CD track, etc., of the shared source, the change affects all rooms sharing this source. However, you cannot change sources for all affected rooms at the same time. The VOLUME, MUTE, ON/OFF, and SLEEP buttons only affect the boxed room(s).
- ☐ An empty box appears for each connected room when you press the HOUSE button. When you change the volume in the HOUSE mode, the numerical level appearing on the display does not represent the actual volume level in all connected rooms. It only represents the actual volume in rooms represented by a boxed letter.

BOSE_SUB-0000043.

625. I understand that Sonos does not dispute that Bose Lifestyle discloses this claim limitation. Specifically, I understand that Google served an interrogatory requesting Sonos's contentions for why Claim 1 of the '885 patent is not invalid over Bose Lifestyle. I have reviewed

Contains Highly Confidential AEO and Source Code Materials

Sonos's response ("Validity Contentions") as it relates to the Sonos System and Sonos does not dispute this claim limitation. *See* Validity Contentions (Attachment A to Sonos's Supp. Rsp. To Google's First Set of Rogs) at 106-107.

(ii) *Limitation 1.1: "a network interface that is configured to communicatively couple the first zone player to at least one data network;"*

626. In my opinion, Bose Lifestyle discloses this claim limitation.

627. For example, Bose Lifestyle discloses a network interface including both Wi-Fi and ethernet capabilities that couples the Bose Lifestyle to a data network existing at least between the Bose Lifestyle and the controller.

Automatic sound level monitoring and control

Your enjoyment of movies is enhanced by Digital Dynamic Range® compression. This technology automatically monitors and adjusts the volume to let you to hear soft sounds, particularly dialogue, but prevents you from being overwhelmed by loud special effects. This is especially useful for late night viewing – it eliminates the need to constantly adjust the volume.

Id. at 4.

628. As shown below, the Bose LifeStyle connects the controller and a speaker system.

When you place your speakers according to the guidelines below, a combination of reflected and direct sound provides the audio atmosphere of a home theater. You may experiment with the placement and orientation of the Jewel Cube® speakers and Acoustimass® module to produce the sound most pleasing to you. For more discussion of speaker placement and room acoustics, see "Fine-tuning your system" on page 36.

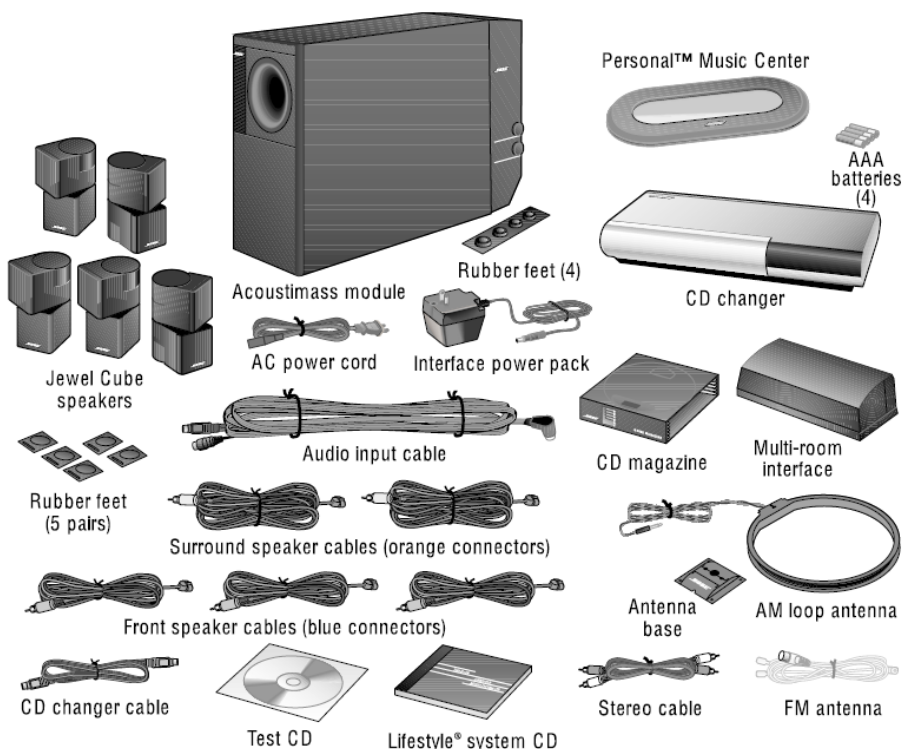
Id.

Contains Highly Confidential AEO and Source Code Materials

Figure 1

What comes with your Lifestyle® 50 system:

- Personal music center
- CD changer
- Multi-room interface
- Interface power pack*
- 5 Jewel Cube® speakers
- 5 speaker cables
- Acoustimass module
- AC power (mains) cord*
- 14 self-adhesive rubber feet (4 for the module and 5 pairs for the Jewel Cube speakers)
- Audio input cable
- CD changer cable
- Stereo cable
- 4 AAA batteries
- FM antenna
- AM loop antenna
- AM antenna base
- CD magazine
- Lifestyle® system CD
- Test CD



Id. at 8.

629. Bose LifeStyle also describes connecting its JewelCube speakers to the Acoustimass module, and being able to match each cable to the corresponding speaker location.

Contains Highly Confidential AEO and Source Code Materials

Connecting the Jewel Cube® speakers to the Acoustimass® module

1. Match each cable to the corresponding speaker location.
 - Front speaker cables have blue RCA connectors at one end, with L, R, or C molded into both the RCA connectors and the Jewel Cube connectors at the other end.
 - Surround speaker cables have orange RCA connectors at one end, with L or R molded into both the RCA connectors and the Jewel Cube connectors at the other end.
2. Insert the Jewel Cube connector of each cable fully into the jack on the rear of one of the five speakers (Figure 7). Match the ridge of the connector to the notch at the top of the jack.
3. Connect each cable to the corresponding jack on the Acoustimass module (Figure 8).
 - Plug the blue connectors into the matching left front, center, and right front jacks.
 - Plug the orange connectors into the matching left surround and right surround jacks.

To lengthen the cable, connect speaker wire with male phono (RCA) plugs on each end to your supplied speaker cable. Use a female-to-female adapter ("barrel" connector). Or, splice in 18-gauge (.75 mm²) or thicker cord (connecting + to + and – to –). To purchase extension wire, see your dealer or electronics store, or call Bose® Customer Service.

Connecting the Acoustimass® module to the multi-room interface

Connect the module to the interface with the audio input cable (Figure 8).

1. Insert the right-angle multi-pin connector on the audio input cable into the AUDIO INPUT jack on the module. Align the connector at the angle shown in Figure 8.
2. Plug the small black multi-pin connector (flat side facing up) into the jack marked ROOM A (PRIMARY) on the back of the interface.

🎵 **Note:** The female RCA connector on the audio input cable is for connecting the digital output of a DVD player or other digital source to the system. See "Setting up a digital sound source" on page 12.

🎵 **Note:** Be sure that each connector is inserted completely into each jack.

For information on connecting multi-room systems, see "Connecting additional rooms" on page 40.

Connecting the CD changer to the multi-room interface

Connect the CD changer to the interface with the CD changer cable (Figure 8).

1. Plug a blue multi-pin connector (flat side facing up) into the jack marked BOSE CD on the back of the interface.
2. Plug the other blue multi-pin connector (flat side facing left) into the jack marked BOSE CD on the back of the CD changer.

Id. at 9.

Contains Highly Confidential AEO and Source Code Materials

630. It is also my opinion that Bose Lifestyle discloses multiple configurations for setting up a speaker configuration: (1) directly to the Lifestyle multi-room interface, and (2) using a stereo TV as the switching center to select the sound source.

How to set up your home theater

There are two basic methods for setting up your home theater. It is best to connect components directly to the Lifestyle® 50 multi-room interface, and select the sound source using the Personal™ music center. A second option is to use a stereo TV as the switching center to select the sound source. In each example, the analog outputs from the DVD player or other digital device are connected to the AUX inputs. You may need extra long audio cables or extensions for some of these connections.

Id. at 13.

Figure 12

Preferred home theater connections to the Lifestyle® 50 system

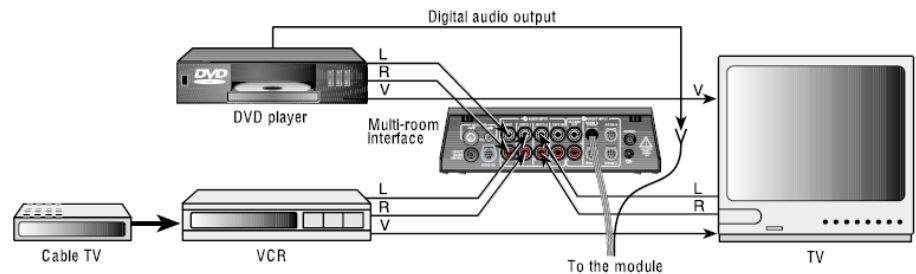
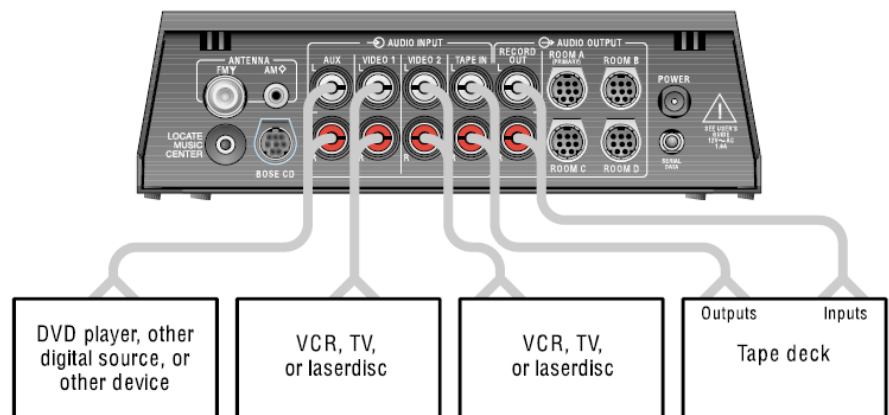


Figure 14

Connecting external components



Id. at 15

Contains Highly Confidential AEO and Source Code Materials

Setting up the Personal™ music center

Set up the Personal music center after the rest of the system is connected and plugged in.

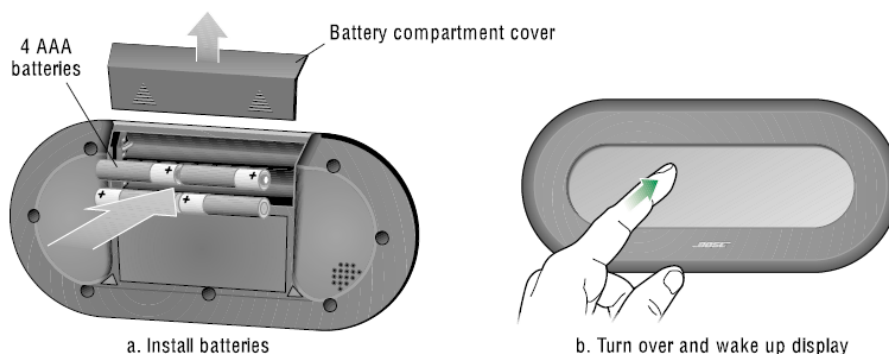
🎵 **Note:** When batteries are first installed in the music center, it sets up a radio-frequency link with the closest multi-room interface.

1. Hold the music center within a few feet of the multi-room interface.
2. Slide open the battery compartment on the back of the music center (Figure 17).
3. Insert 4 AAA or IEC-R03 1.5V batteries, or the equivalent, as shown. Match the + and – symbols on the batteries with the + and – markings inside the compartment.
4. Slide the battery compartment cover back into place.
5. Turn the music center over and touch the screen to wake it up if it appears blank. Press ON/OFF, FM, or any other source button to turn the system on.

If the music center continuously displays “NO RESPONSE,” you need to try to establish its link with the multi-room interface again. Hold the music center close to the multi-room interface. Press and hold MUTE for about 5 seconds until you hear a beep and then release. After about 10 seconds, the music center should beep twice to confirm that the link is established.

Figure 17

Installing batteries and waking up the display for the first time



🎵 **Note:** Replace the batteries when the LOW BATTERY message first appears. See “Replacing batteries” on page 44. Alkaline batteries are recommended.

Id. at 18.

Turning on the system

You are ready to enjoy your new Lifestyle® system. Your Personal™ music center places complete control of the system operations in your hands. The center is portable, communicating with the rest of the system through a two-way radio-frequency link. The display is backlit for easy viewing, and provides visual feedback of current system operations and available options. To allow for maximum battery life, the display and backlight turn off a short time after your last button press. You only need to touch the screen to wake up the music center.

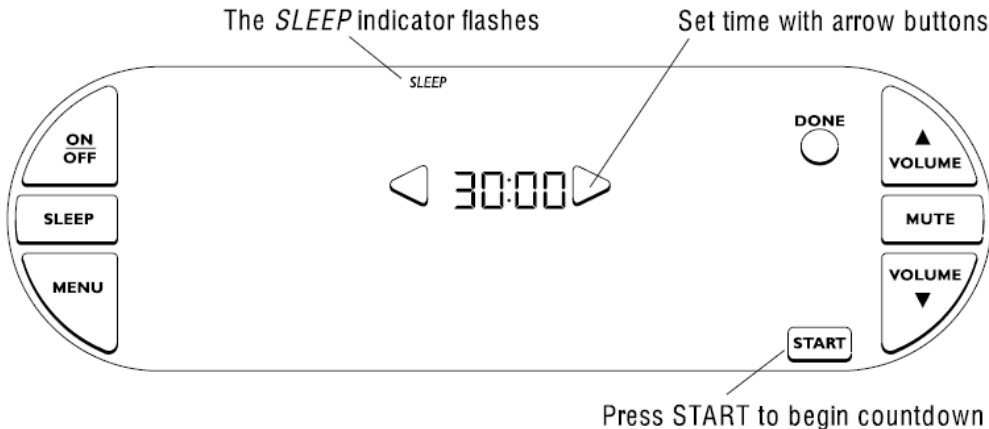
- To learn more about the display, see “Using the Personal music center display” on pages 20-21.
- To operate the AM/FM radio, see “Listening to the radio” on pages 26-28.
- To operate the CD changer, see “Listening to compact discs” on pages 29-34. To verify your system setup, listen to the instructions on the Test CD.
- To control external components, see “Using the system with external components” on page 35.
- To use your system in multiple rooms, see “Operating in more than one room” on pages 41-43.

Contains Highly Confidential AEO and Source Code Materials

Using the sleep timer

- Press the SLEEP button to access the sleep timer for automatic shutoff. The display flashes a sleep time of 30 minutes or the most recent sleep time setting (Figure 20). The *SLEEP* indicator is also flashing.
- Use the arrow buttons to set the sleep timer to 1 to 99 minutes.
- Press the START button to start the counter. The START button disappears and a CLEAR button appears at the bottom of the display.

Before pressing START ...



Id. at 20.

display

Listening to the system

Your Lifestyle® 50 system uses digital signal processing to bring even greater realism and impact to both movies and music recordings. Built-in Dolby Digital decoding delivers up to 5.1 discrete audio channels (that is, five for the independent Jewel Cube® speakers and one for rich bass from the Acoustimass® module) from DVD, digital TV, next-generation cable boxes, and satellite receivers. With analog formats, as well as for two-channel PCM and Dolby Digital bitstreams, Videostage® decoding steers front information to the left, center, and right, and directs surround information to the left and right rear channels. As a result, the sound of stereo broadcasts and rented or recorded tapes can approach that of your DVD discs.

In addition, Videostage decoding can process a one-channel program and direct five-channel sound to five independent speakers. Dialogue remains locked on-screen, while music and ambient effects fill the room to increase your listening enjoyment.

You may choose to listen through two, three, or five speakers. Traditional stereo may be enjoyed through two or more speakers. Listening through three or five speakers helps anchor the dialogue of movies to the picture and provides a more solid image for music vocals. For the greatest surround effect, listening through five speakers gives you the most convincing sound experience.

631. Bose Lifestyle also provides for connecting speakers to a multi-room interface that resides in the user's primary room, and then provides for the ability to operate in multiple rooms.

Contains Highly Confidential AEO and Source Code Materials

Connecting additional rooms

Follow the placement guidelines for the Bose® powered speakers that you plan to connect. Then review your plan for how to connect these speakers to the multi-room interface in your primary room. If you have questions or need extension cables to complete the connections, call Bose Customer Service at the numbers listed on the back inside cover of this owner's guide.

CAUTION: Make sure all components are unplugged from the power outlet before you begin hooking up additional speakers.

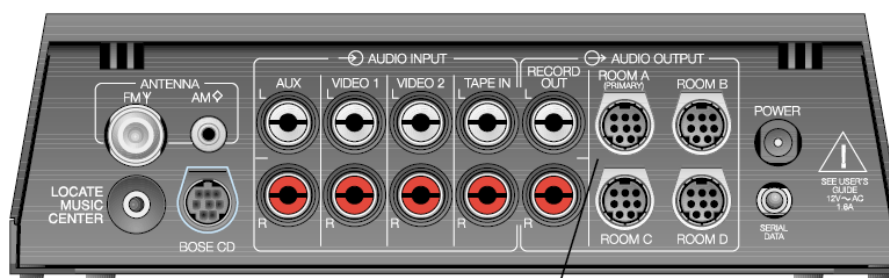
Connect the audio input cable from your additional powered speakers to the selected ROOM jack on the back of the multi-room interface.

1. Plug the small black multi-pin connector (flat side facing up) into the jack marked ROOM B, C, or D on the back of the interface.
2. Follow the instructions that came with your speakers for connecting the cable to the speakers.

Note: Be sure that each connector is inserted completely into each jack.

Figure 47

ROOM jacks on the multi-room interface



Room A, B, C, and D jacks

Id. at 40.

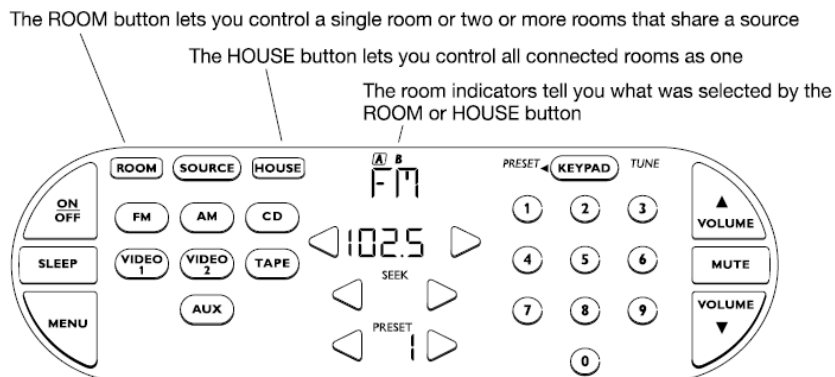
Contains Highly Confidential AEO and Source Code Materials

Operating in more than one room

Your Lifestyle® 50 system can control up to four sets of Bose® powered speakers, allowing your family to enjoy different audio sources (CD, radio, TV, etc.) in up to four rooms. These rooms are referred to as room A, B, C, and D, with room A being the primary room (the one used for a one-room system). If two or more rooms are connected to your system, the Personal™ music center displays ROOM and HOUSE buttons, and room indicators (A, B, C, and/or D). Figure 48 shows an example display for a two-room system.

Figure 48

Example display for a two-room system

**Understanding the room indicators**

- ☒ **A** A boxed letter indicates the presently-selected room or rooms. The selected room is affected by any source changes, or any change you make using the VOLUME, MUTE, ON/OFF, or SLEEP buttons.
- ☐ **B** An unboxed letter indicates a room listening to a **shared source**. A shared source is one that is playing in the controlled room as well as in up to three additional rooms. If you change the radio station, CD track, etc., of the shared source, the change affects all rooms sharing this source. However, you cannot change sources for all affected rooms at the same time. The VOLUME, MUTE, ON/OFF, and SLEEP buttons only affect the boxed room(s).
- ☐ An empty box appears for each connected room when you press the HOUSE button. When you change the volume in the HOUSE mode, the numerical level appearing on the display does not represent the actual volume level in all connected rooms. It only represents the actual volume in rooms represented by a boxed letter.

Contains Highly Confidential AEO and Source Code Materials

Using the ROOM button

The ROOM button allows you to select any connected room and control any sound source you want to hear in that room. Each time you press the ROOM button you can transfer control from one room to the next in A-B-C-D order. The room indicators on the display tell you what is currently selected. Rooms listening to a shared source can be linked and controlled as one room.

Turning on different sources in more than one room

Let's say you have a two-room system (rooms A and B) and the entire system is off. To turn on a different source in each room:

1. Wake up the Personal™ music center.
2. Press the ROOM button until the room indicator **[A]** is displayed. Press a source button, such as VIDEO 1, to turn on the system and listen to your DVD player in room A. Adjust the volume to the desired level.
3. Press the ROOM button again. The room indicator **[B]** is displayed. Press a different source button, such as CD, to listen to a CD in room B. Again, adjust the volume to the desired level.
4. Press the ROOM button again and notice that the room indicator **[A]** is displayed. You are controlling room A once again and the displays indicates that the VIDEO 1 source is on.

Setting up a shared source

Now, let's say the system is already on and you want to play the FM radio in rooms A and B:

1. Wake up the Personal music center.
2. Press the ROOM button until the room indicator **[A]** is displayed. Press the FM source button and adjust the volume to the desired level for room A.
3. Press the ROOM button again to select room **[B]**. Press the FM source button and adjust the volume to the desired level for room B. Now, the indicators **A [B]** are displayed.
4. Press the ROOM button again. The indicators **[A] [B]** appear on the display indicating that you can control these two rooms together. Any button command given now (SOURCE, VOLUME, MUTE, ON/OFF, SLEEP) is applied to both rooms.

Note: Remember that there are limits to using different sources in different rooms. With one tuner, the system cannot play one radio station in one room and another radio station in another. Similarly, with one CD changer, the system cannot play two different CDs at the same time.

Linking rooms for common control

There are two ways to link rooms in order to control them as one.

- Set up a shared source in two or more rooms and select them together using the ROOM button. See "Setting up a shared source" above.
- Link all connected rooms using the HOUSE button. See "Using the HOUSE button" on page 43.

Returning to single-room control

After you have gained control of multiple rooms using the ROOM button, you can use the ROOM button again to gain control of a single room. Press ROOM until the room you want is displayed (**[A]**, **[B]**, **[C]**, or **[D]**). Control that room as desired.

Contains Highly Confidential AEO and Source Code Materials

Id. at 43.

Using the HOUSE button

Using the HOUSE button, you can link all rooms together and control them as one. When you press the HOUSE button, an empty box indicator is displayed for each connected room. Any button pressed after that (any source button, VOLUME, MUTE, or SLEEP) affects every room. When you are done listening you can press OFF to turn off the entire system.

Note: *If you do not press any additional buttons after pressing HOUSE, pressing HOUSE again cancels HOUSE mode.*

Press the HOUSE button before each command to apply that command to all rooms:

Press ...	To do this ...
HOUSE then a source	Play the selected source in all connected rooms.
HOUSE then VOLUME ▲▼	Adjust the volume up or down by the same amount in all rooms that are on, or all connected rooms if they are all off. The system remembers the differences among the original room volume settings.
HOUSE then MUTE	Silence all connected rooms that are on, even if any were previously muted individually. To cancel this command, press HOUSE then MUTE again. Any rooms that were muted before this command was given stay silent until individually unmuted. If you unmute an individual room after it was muted by a HOUSE - MUTE command, the other rooms remain silent until each one is unmuted individually. Pressing HOUSE then VOLUME ▲ unmutes all muted rooms.
HOUSE then SLEEP	Set the SLEEP timer for all rooms that are on. The SLEEP time selected applies to all rooms that are on even if they are playing different sources. If the SLEEP timer was already set in one or more rooms, the display shows the longest time already set. You can accept this time or change it for all the rooms. To cancel the HOUSE - SLEEP command, press HOUSE, SLEEP, CLEAR, and then DONE.
HOUSE then OFF	Turn off the entire system.

Note: *Instead of setting the whole house to one sleep time, you can set different sleep times for individual rooms by using the ROOM button to select each room and setting SLEEP.*

When two or more rooms are linked, adjusting the SLEEP time affects all linked rooms (indicated by boxed letters).

Id. at 43.

632. Further, and as evidenced below, for example, Bose Lifestyle explicitly allows for multiple zones and operation.

Contains Highly Confidential AEO and Source Code Materials

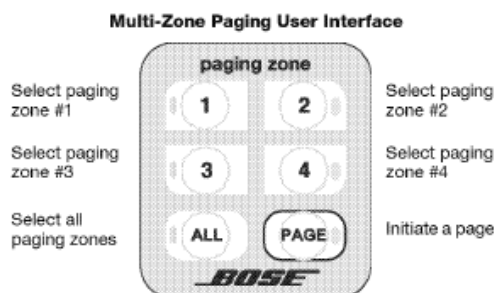
7.0 User Interface Operation

7.5 Multi-zone paging user interface operation

The Multi-zone paging user interface provides keys to select single paging zones, all paging zones and initiate a page.

Paging zones are not the same as output zones. After assigning the PAGE source to the output zones and choosing the appropriate settings in the Page Setup control pane, flashing the hardware maps the paging zone buttons accordingly.

When mapped, the paging zone **1** button will select the lowest numbered output ZONE to which the PAGE source is assigned. The paging zone **2** button will select the next lowest numbered output ZONE to which the PAGE source is assigned, and so forth.



- Press **1**, **2**, **3** or **4** to select a paging zone. A green LED flashes to indicate that the zone is selected for paging. After ending a page the LED turns off.
- Press **ALL** to select all paging zones.
- Press **PAGE** to initiate a page in systems that do not use a PTT microphone.

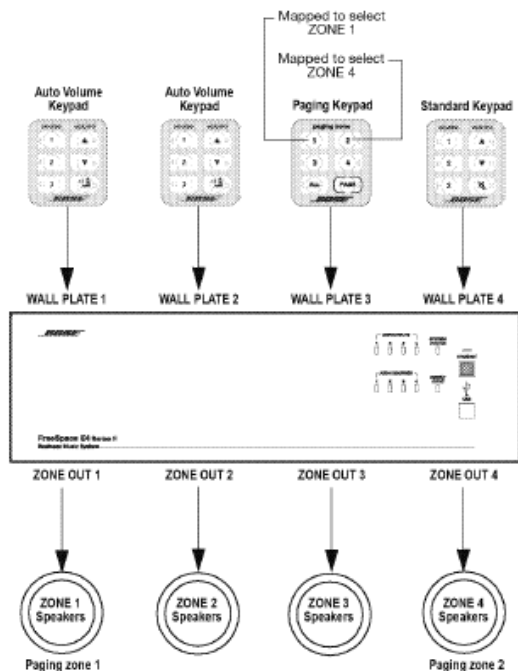
Paging User Interface Example:

- The **PAGE** source is assigned to ZONE OUT 1 and ZONE OUT 4.
- In the Page Setup control pane for ZONE 1 and ZONE 4:

Paging Type = Multi-zone

PAGE Control = Wall plate 3

- After flashing the hardware, the paging zone **1** button selects ZONE OUT 1 for paging, and the paging zone **2** button selects ZONE OUT 4 for paging.



Contains Highly Confidential AEO and Source Code Materials

Figure 1: Two-Zone System

Example System: Small Market

The store is comprised of two zones, the main retail area and the cashier area. The main retail area receives music and paging, and operates at a fixed volume level.

The cashier area also receives music and paging, but its volume is controlled by the Auto Volume function and an Auto Volume wall plate.

		Zone 1 Retail	Zone 2 Cashier	Zone 3	Zone 4
Sources	Music	•	•		
	Paging	•	•		
Controls	Standard Wallplate	•			
	Auto Volume Wallplate		•		

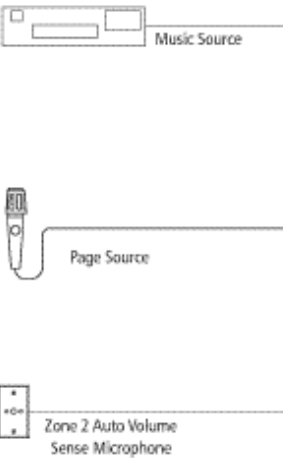


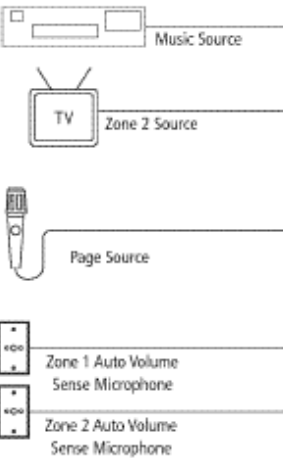
Figure 2: Four-Zone System

Example System: Restaurant

The restaurant is comprised of four zones: dining, bar, patio, and the restrooms and lobby. All zones receive the music source, and the bar and lobby area receive paging. The bar area also can select the television audio source.

The dining and bar areas' volume is controlled by the Auto Volume function. The remaining zones, the patio and restrooms/lobby, are controlled using standard wall plate controls. A multi-zone paging interface is connected to the wall plate number four connection to provide independent paging of the two page zones.

		Zone 1 Dining	Zone 2 Bar	Zone 3 Patio	Zone 4 Entry/Restrooms
Sources	Music	•	•	•	•
	TV		•		
	Paging		•		•
Controls	Standard Wallplate			•	•
	Auto Volume Wallplate	•	•		



Information subject to change without notice.

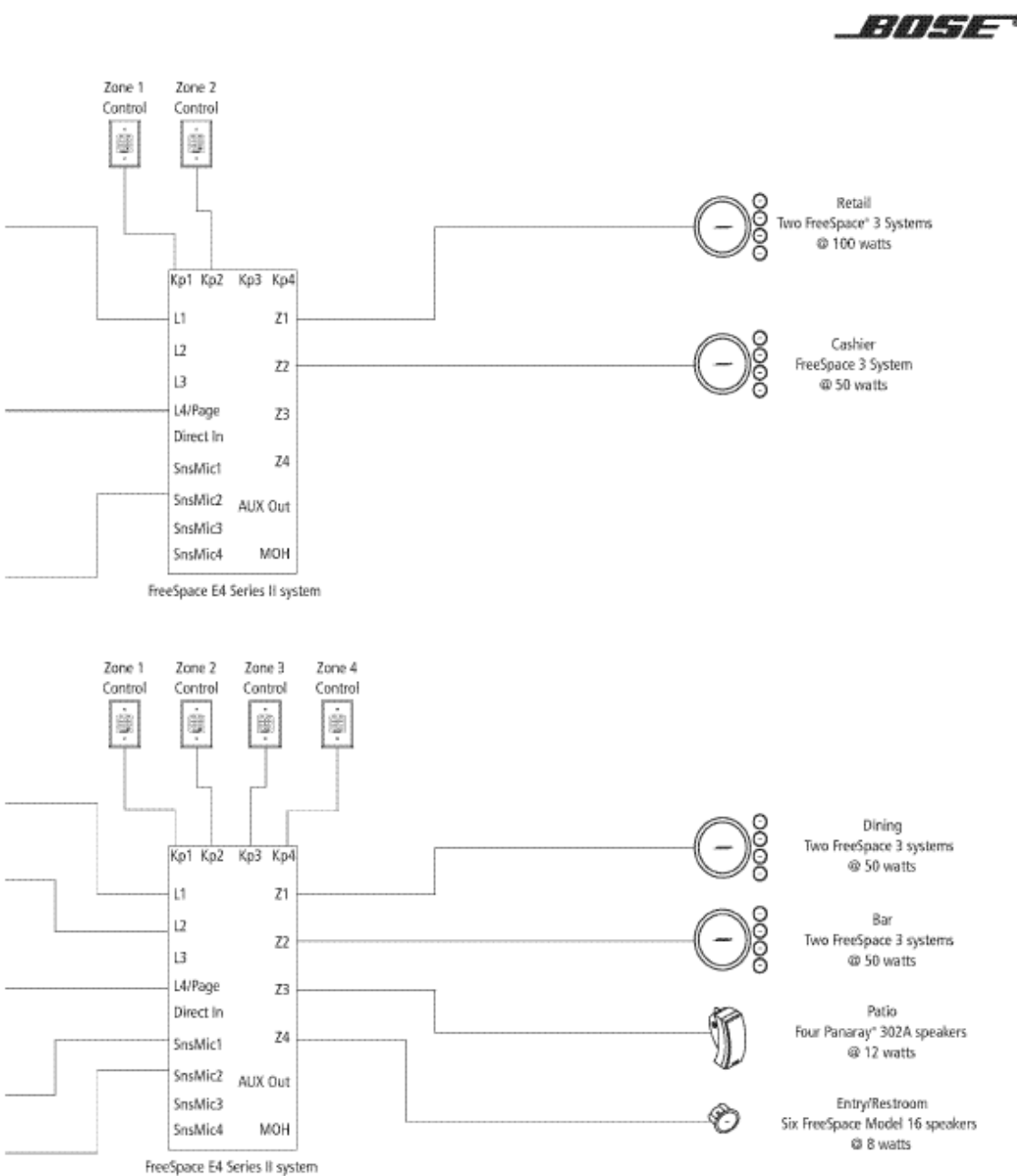
5 OF 8

pro.bose.com

BOSE_SUB-0000144

BOSE_SUB-0000144.

Contains Highly Confidential AEO and Source Code Materials



Information subject to change without notice.

6 OF 8

pro.bose.com

BOSE_SUB-0000145

BOSE_SUB-0000145.

633. Bose LifeStyle also allows for playing in multiple rooms.

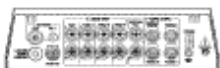
Contains Highly Confidential AEO and Source Code Materials

Setting Up Your Lifestyle® Stereo Amplifier

Multi-room interface setup

English

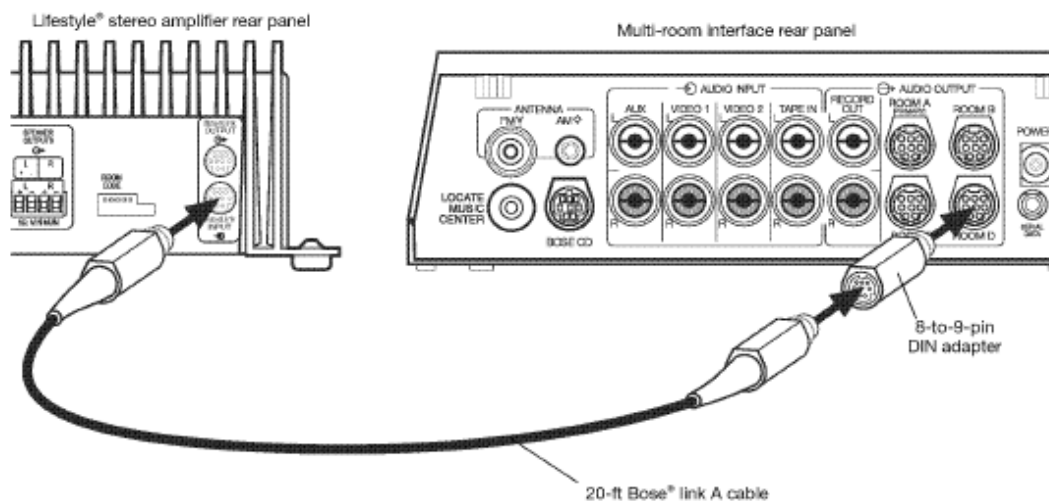
CAUTION: Before making any connections, turn the Lifestyle® system off and disconnect the music center from the AC (mains) power outlet. DO NOT plug the amplifier into an outlet until you have completed all other connections.



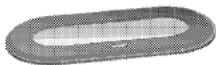
1. Insert the 8-to-9-pin adapter into one of the unused ROOM output connectors (B, C, or D) on the rear of the multi-room interface (Figure 10).
2. Insert one end of the Bose® link A cable into the 8-to-9-pin adapter.
3. Insert the other end of the Bose® link A cable, into the Bose® link input connector on the rear panel of the Lifestyle® stereo amplifier.

Figure 10

Lifestyle® stereo amplifier
to multi-room interface
connections



Contains Highly Confidential AEO and Source Code Materials

Setting Up Your Lifestyle® Stereo Amplifier**Setting up the Personal® music center**

Systems that have a multi-room interface are controlled by the Personal® music center which requires no internal switch settings before it allows you to control more than one room of speakers. However, if you purchase a second Personal® music center, you must follow the procedure for setting up the Personal® music center for the first time.

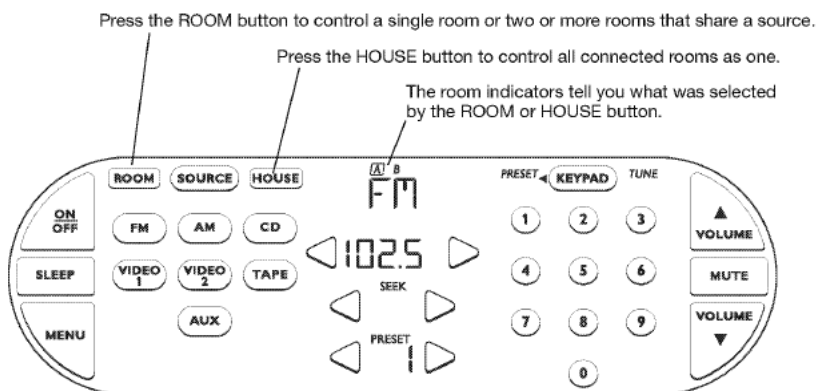
🎵 **Note:** Refer to your Lifestyle® system owner's guide for more information on operating your system in more than one room.

Selecting other rooms with the Personal® music center

The Personal® music center allows you to control up to four sets of Bose® powered speakers placed in individual rooms. These rooms are referred to as room A, B, C, and D, with room A being the primary room (the one used for a one-room system). If two or more rooms are connected to your system, the Personal® music center displays ROOM and HOUSE buttons, and room indicators (A, B, C, and/or D). Figure 11 shows a sample display for a two-room system.

Figure 11

Sample display for a two-room system



BOSE_SUB-0000290.

Contains Highly Confidential AEO and Source Code Materials

Setting Up Your Lifestyle® Stereo Amplifier**Setting up the RC-20 remote for Zone 2**

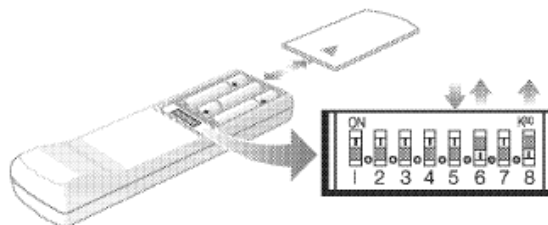
If your system uses a Model 20 music center, you need to set up a second RC-20 remote control to operate the ZONE 2 outputs.

1. Remove the remote control battery cover and locate the miniature switches (Figure 13).
2. Make sure that the house code settings (switches 1, 2, 3, and 4) match those in your first remote.
3. Slide switch 5 down (off), and switches 6 and 8 up (on).

Note: Refer to your Lifestyle® system owner's guide for more information on operating your system in more than one room.

Figure 13

RC-20 remote Zone 2
switch settings



English

BOSE_SUB-0000292.

634. Bose Lifestyle provide instructions for setting up additional rooms.

Contains Highly Confidential AEO and Source Code Materials

Setting Up Additional Rooms For Sound

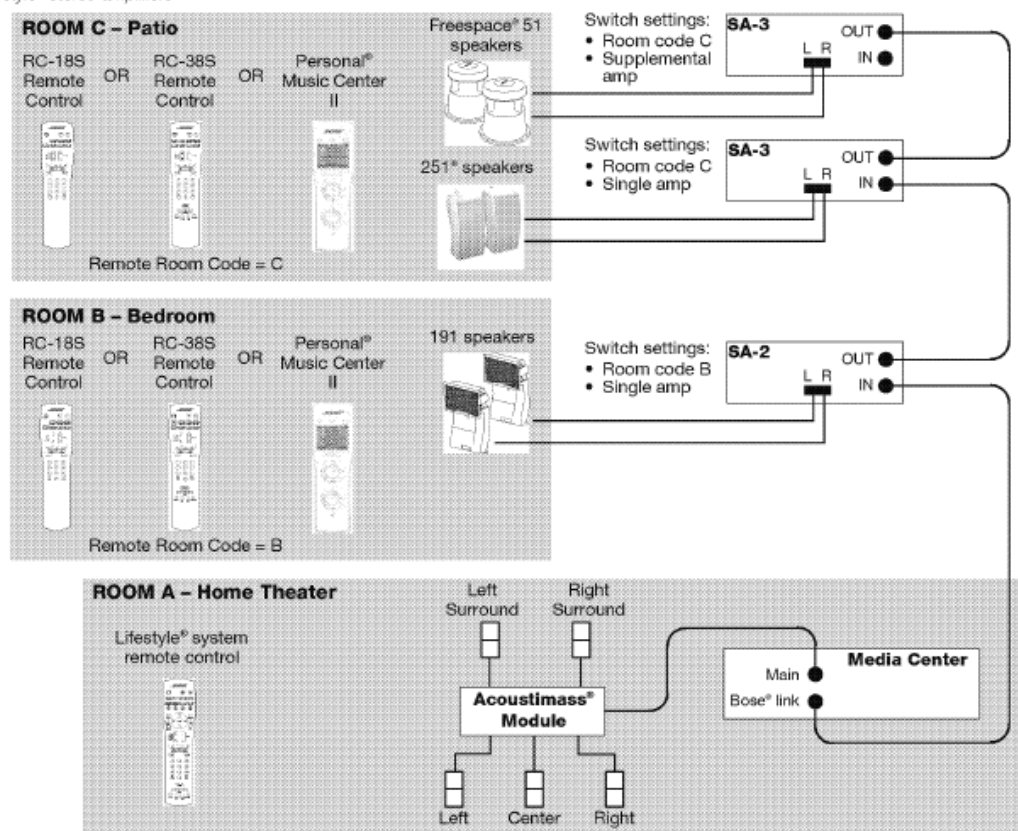
Setup guidelines for additional rooms

If you have a Lifestyle® 18 series II, 28 series II, 38 or 48 home entertainment system, you can experience stereo sound in up to 14 other rooms using Lifestyle® stereo amplifiers, compatible speaker systems and remote controls for the other rooms.

- Remote controls for other rooms must be set to the same house code as the main room remote, but each remote must be set to a different room code. See "Setting up remote controls for other rooms" on page 23.
- The Lifestyle® amplifier and its remote control must be set to the same room code. See "Setting up the amplifier room code" on page 24.
- When using more than one amplifier to power more than two speakers in a room (Figure 18, room C), all amplifiers must be set to the same room code. Also, one amplifier must be set to the single amp mode and all others must be set to the supplemental amp mode. See "Single and supplemental amplifiers" on page 25.

Figure 18

Sample installation of Lifestyle® stereo amplifiers



Contains Highly Confidential AEO and Source Code Materials

Setting Up Additional Rooms For Sound

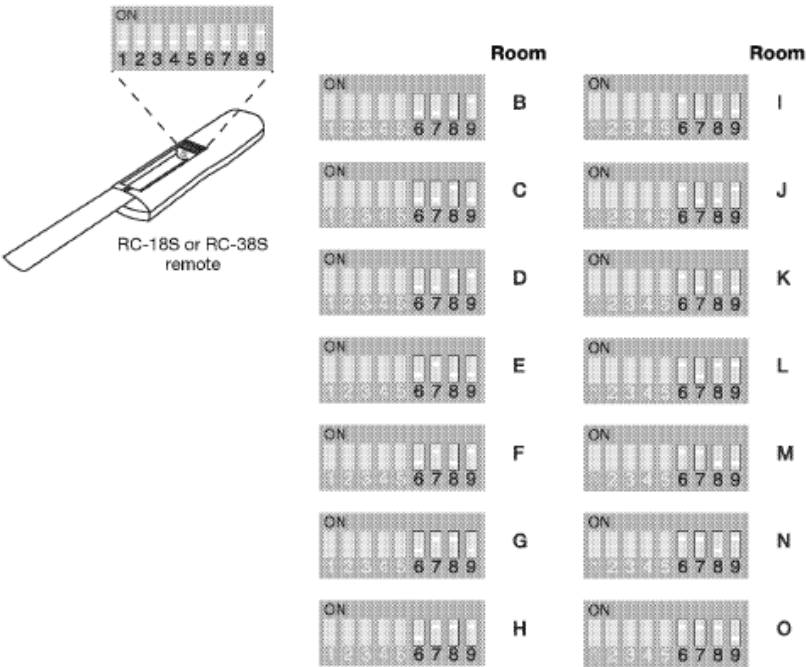
Setting up remote controls for other rooms

To set up the RC-18S or RC-38S remote:

- 1. Remove the remote control battery cover and locate the microswitches (Figure 19).
- 2. Make sure that the house code settings (switches 1, 2, 3, and 4) match the house code settings in your main room remote.
- 3. This remote is shipped from the factory set for room B. If this remote is used beyond a second room, set switches 6, 7, 8, and 9 to the same room code as set in the Lifestyle® stereo amplifier.

Note: Refer to your Lifestyle® system owner's guide for more information on operating your system in more than one room.

Figure 19
Microswitch settings for
RC-18S and RC-38S
remotes

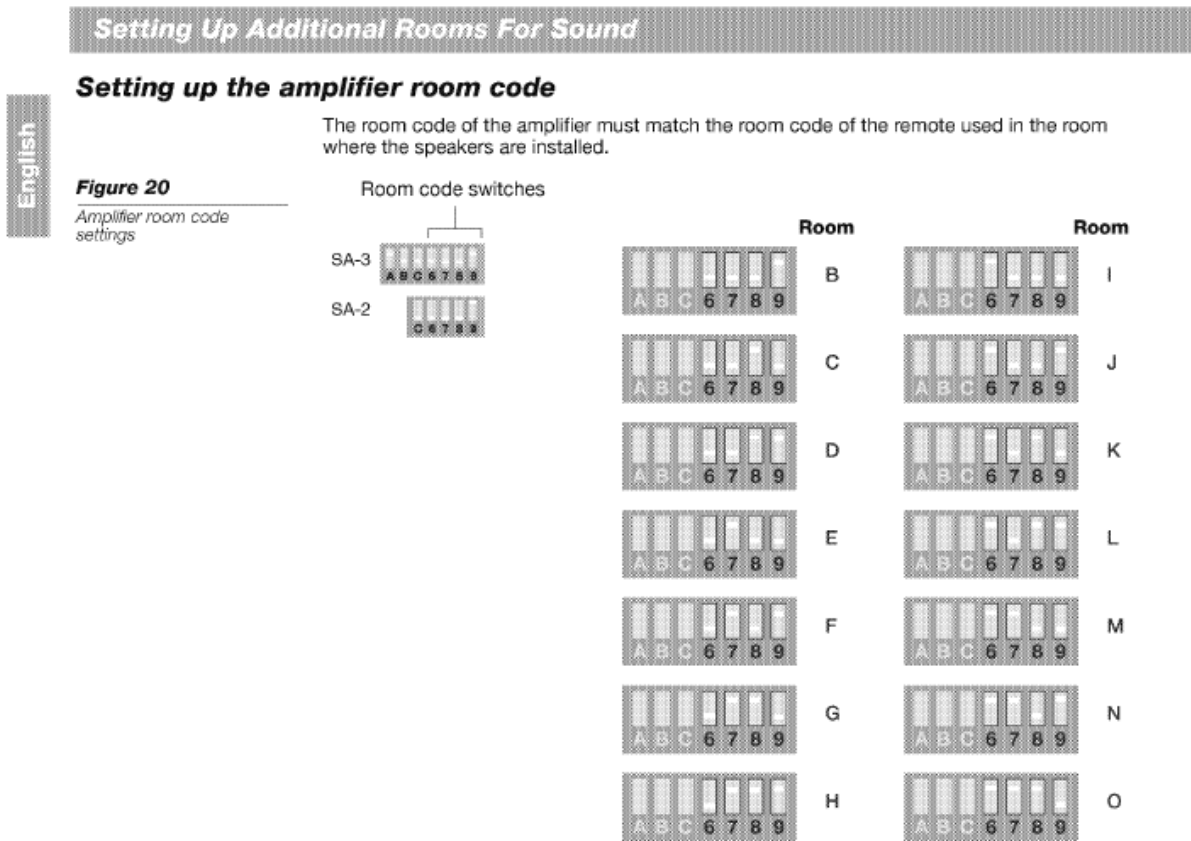


To set up the Personal® music center II:

Refer to the owner's guide included with the Personal® music center II for instructions on configuring this remote for other rooms.

English

Contains Highly Confidential AEO and Source Code Materials



24


BOSE_SUB-0000386

BOSE_SUB-0000386.


635. Bose Lifestyle specifically teaches a “Bose Link” that is a communication protocol

Contains Highly Confidential AEO and Source Code Materials

that allows for the playing of audio in multiple room or multiple zones.



Company Confidential



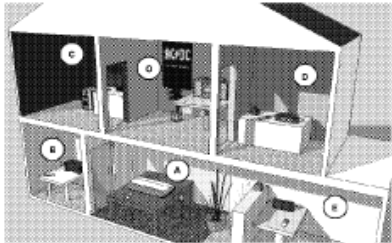
What is Bose Link?

Bose link is a communication protocol. To communicate there must be at least two participants that speak the same language. To Bose products, Bose link is that language.

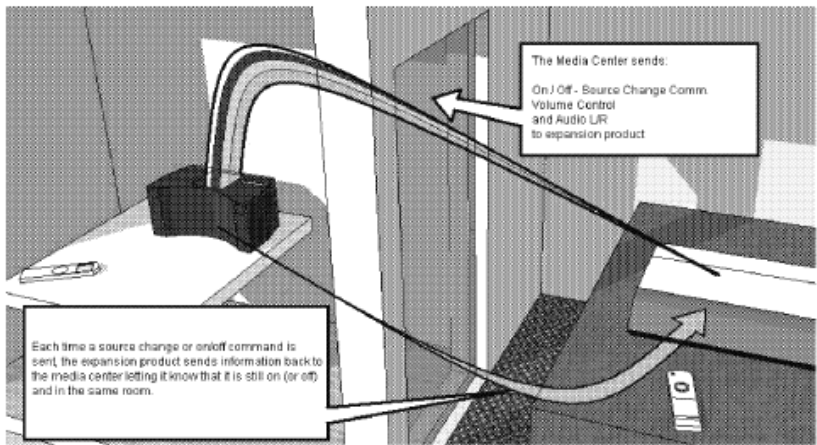
Rooms

There are 15 different rooms that can be controlled by a Bose link enabled media center. The main room – labeled room A – is reserved for the Lifestyle speaker components. The other rooms – rooms B-O – are reserved for expansion via Bose link.

For a Bose link setup to work the system must include a Bose link enabled media center (a controller), a Bose link expansion product, and an expansion remote control. Both the expansion product and the remote must be configured to operate on the same room.



A Bose link connection is essentially a conversation between the media center and the expansion device. The media center sends on/off, volume and source change commands along with audio to the expansion product. The expansion product responds by sending information back to the media center to let it know that it is still on (or off) and in the same room. This information exchange occurs each time a power or source change command is issued by the expansion remote.



When the media center receives an ON command from an expansion remote the system turns on and checks for any Bose link products that might be connected, but it will only look for Bose link products that are assigned to the same room as the remote.

Understanding Bose® link

Page 2 of 8

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

BOSE_SUB-0000595

BOSE_SUB-0000595.

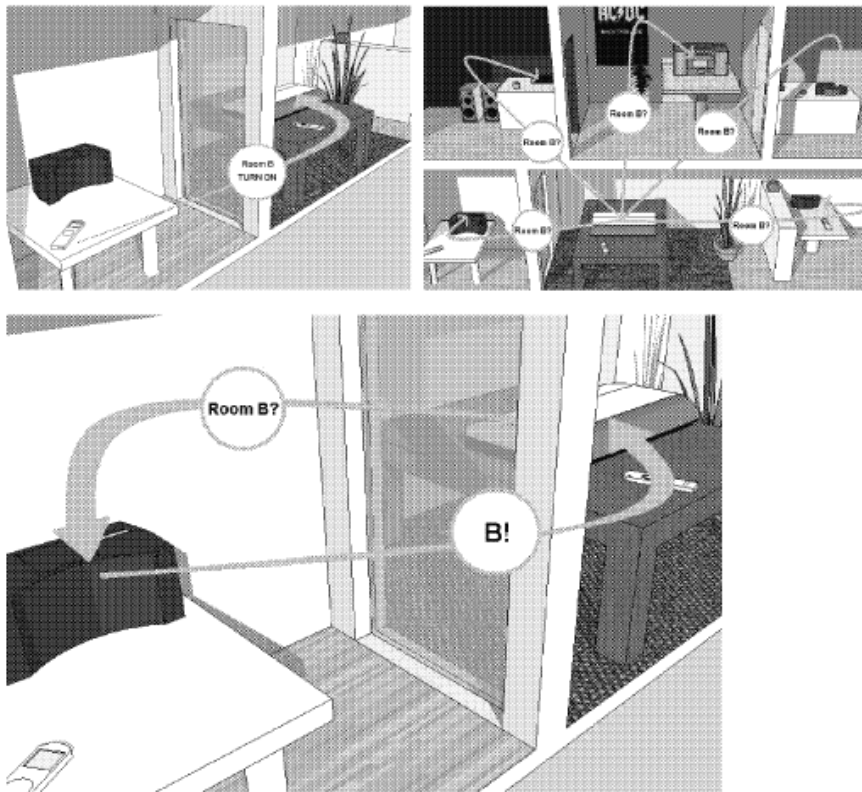
Contains Highly Confidential AEO and Source Code Materials



Company Confidential



If the media center receives a command from a remote configured for room B, for example, the media center calls out to other Bose link products which might be assigned to room B. If a connected expansion product is assigned to room B it will respond to the media center and a Bose link connection will be made. The media center will not acknowledge a response from anything not assigned to room B.



The media center will not acknowledge more than one response from the same room, either. As with any productive conversation, there can only be one person speaking at a time. If more than one product is assigned to room B the media center won't know which one to listen to. If the media center can't understand the response from the expansion products, or if there is no response at all, the media center will turn itself off and the Bose link connection will not be successful.

Understanding Bose® link

Page 3 of 8

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

BOSE_SUB-0000596

BOSE_SUB-0000596.

Contains Highly Confidential AEO and Source Code Materials



Streams

A Bose link enabled media center is also capable of managing two separate sources at the same time. Each source can be sent to one of two different outputs - or 'streams' - within the Bose link connection. 4 of the 9 pins that make up the Bose link connection on the back of the media are responsible for delivering these streams - all of which are analog. Two pins are reserved for stream 1 audio L/R (fixed), and another two pins carry stream 2 audio L/R (fixed) - (there is another pair of pins that carry variable stream 2 audio that will be discussed later). Every Bose link expansion product has 2 inputs to accommodate each stream, and the remote control tells the device which stream to listen to. The expansion products receive fixed audio and then control volume via commands they receive from the media center carried on other pins.

Here is an example:

If an expansion remote configured for stream 1 sends an ON command to the media center, the media center will activate the pins that carry stream 1 information. The media center will also call out to any Bose link product set to the same room code as the remote. If the media center gets an answer it can understand, it will respond by telling the expansion product to turn on and listen to its stream 1 inputs. If the media center does not get a response from an expansion product set to the same room as the remote it will simply turn itself off.

The main room, or room A, can only operate on stream 1. Although any of the expansion rooms can be configured to operate on either stream 1 or stream 2, expansion rooms are generally assigned to stream 2. Since only one source can be sent to each stream at any given time, keeping Bose link expansion products on stream 2 prevents changes made in expansion rooms from affecting what is being played in the main room, and vice-versa.

BOSE_SUB-0000597.

636. I understand that Sonos does not meaningfully dispute that Bose Lifestyle discloses

Contains Highly Confidential AEO and Source Code Materials

this claim limitation. Specifically, I understand that Google served an interrogatory requesting Sonos's contentions for why Claim 1 of the '885 patent is not invalid over Bose LifeStyle. I have reviewed Sonos's response ("Validity Contentions") as it relates to Bose LifeStyle and Sonos does not dispute this claim limitation. *See* Validity Contentions (Attachment A to Sonos's Supp. Rsp. To Google's First Set of Rqs) at 89.

(iii) *Limitation 1.2: "one or more processors;"*

637. In my opinion, Bose LifeStyle discloses this claim limitation. For example, Bose LifeStyle utilizes Jewel Cube speakers, and the multi-room interface, with four independent audio outputs allow you to enjoy Bose sound throughout one's home.

Thank you for purchasing the Bose® Lifestyle® 50 system. Years of research lie behind this complete audio home entertainment system – the most advanced home theater system from Bose. Technological innovations that make the Lifestyle® 50 system unique include the Bose Personal™ music center, which places all system operations in the palm of your hand, and tiny Jewel Cube® speakers.

The interactive Personal music center is a clear departure from convention, communicating with the system through a two-way radio data link. The result for you is full control of this entertainment system as you move about your home.

BOSE_SUB-000006.

The other elements of the Lifestyle® 50 system are designed to be hidden from view:

- The elegant Lifestyle® CD changer, designed to give you flexibility in where it is placed
- The hideaway powered Acoustimass® module that delivers the rich, full, lifelike bass
- The Bose multi-room interface, with four independent audio outputs that allow you to enjoy Bose sound throughout your home.

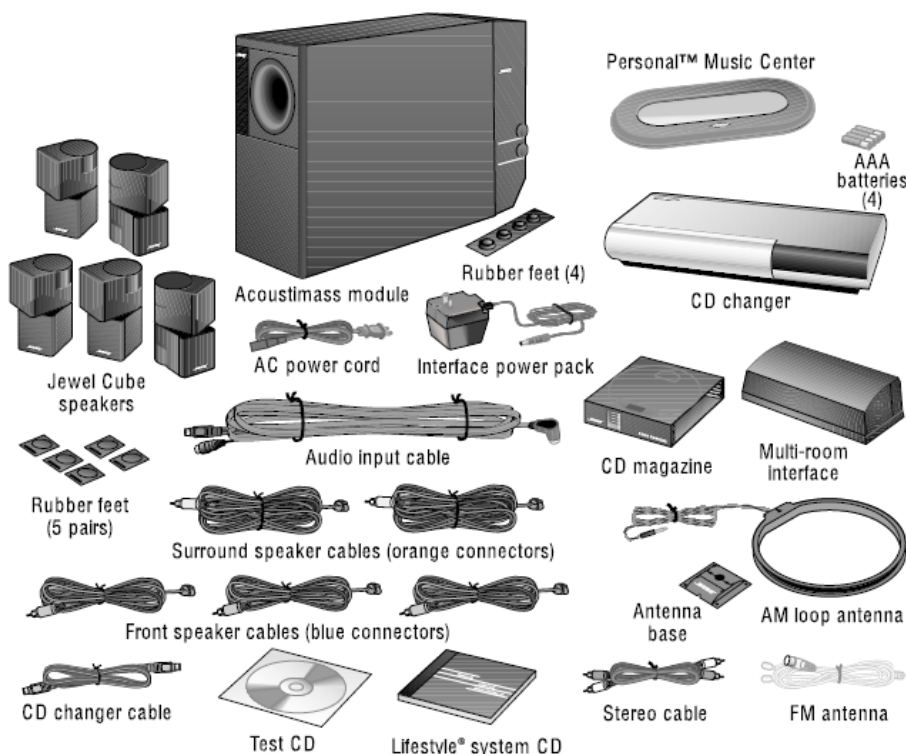
Id.

Contains Highly Confidential AEO and Source Code Materials

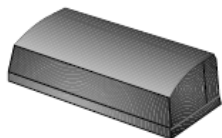
Figure 1

What comes with your Lifestyle® 50 system:

- Personal music center
- CD changer
- Multi-room interface
- Interface power pack*
- 5 Jewel Cube® speakers
- 5 speaker cables
- Acoustimass module
- AC power (mains) cord*
- 14 self-adhesive rubber feet (4 for the module and 5 pairs for the Jewel Cube speakers)
- Audio input cable
- CD changer cable
- Stereo cable
- 4 AAA batteries
- FM antenna
- AM loop antenna
- AM antenna base
- CD magazine
- Lifestyle® system CD
- Test CD

**Figure 5**

The multi-room interface



Multi-room interface

Select a location for the multi-room interface. It may be placed out of sight if you like.

1. Place the multi-room interface within 30 feet (9.1 m) of the Acoustimass module (the length of the audio input cable).
2. Place the multi-room interface close enough to the sound sources (TV, VCR, DVD, etc.) to allow for cable length. If you need additional audio and/or video cables to connect all of your components, see your dealer or call Bose® Customer Service.

BOSE_SUB-0000007.

638. Beyond that, internal Bose presentations and circuit diagrams show various hardware circuitry, including DSPs.

Contains Highly Confidential AEO and Source Code Materials

FreeSpace® E4 Series II Service & Repair Training

11/28/2004 3:12 PM

Agenda – E4 Series II Service

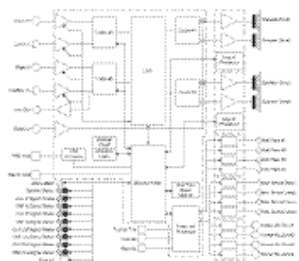
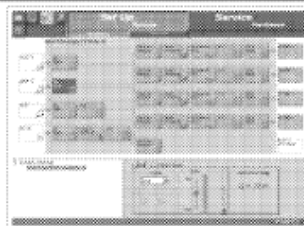
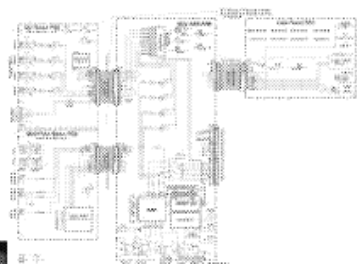
- Series I vs. Series II service plan – Bob Smith
- Application Overview – Rob Kosman
 - Hands-On: System Setup & Operation
- E4 Series II: Software – Pete Farese
 - Firmware locations (All except Host covered in Hardware)
 - Updating procedures: Host Code (via FSI)
- E4 Series II: Hardware Overview – Dan Pearce
 - System Architecture
 - DSP, UI & Analog Inputs
 - Power Supply & Power Amplifiers
- Troubleshooting & Repair – Dan + Pete + Gordon?

Agenda – E4 Series II Hardware

- System Architecture - Overview
- DSP (=User Interface, Analog Inputs) – Operation
- DSP Troubleshooting & Repair
- Power Supply & Power Amplifiers – Operation
- PS/PA Troubleshooting & Repair
- Repair Verification

E4 System Hardware Overview

- Analog Inputs
 - 2 Low EIA-485
 - 3 Balanced MultiLine
 - PTT
- Auxiliary Circuits
 - Wall Plug Input
 - Servo (PIC) inputs
 - Auto & manual Gas
- A/D Converters
- DSP
- D/A Converters
- Emergency Override In
- Power Amplifiers

**DSP Functions: FreeSpace® Installer™ software****DSP, UI and Analog Inputs: Hardware****DSP, UI + A: Troubleshooting**

- Evidence obtained through FS's Fault Log
- Connect to E4 & get Fault Log before disassembly
- Most DSP-related faults reported in P.O.S.T.
- Refer to theory of operation for more details on individual processors and their roles.
 - Host Processor: Control + PC to other processors
 - DSP
 - User Interface PIC processor
 - Amplifier PIC processors

Hardware Section

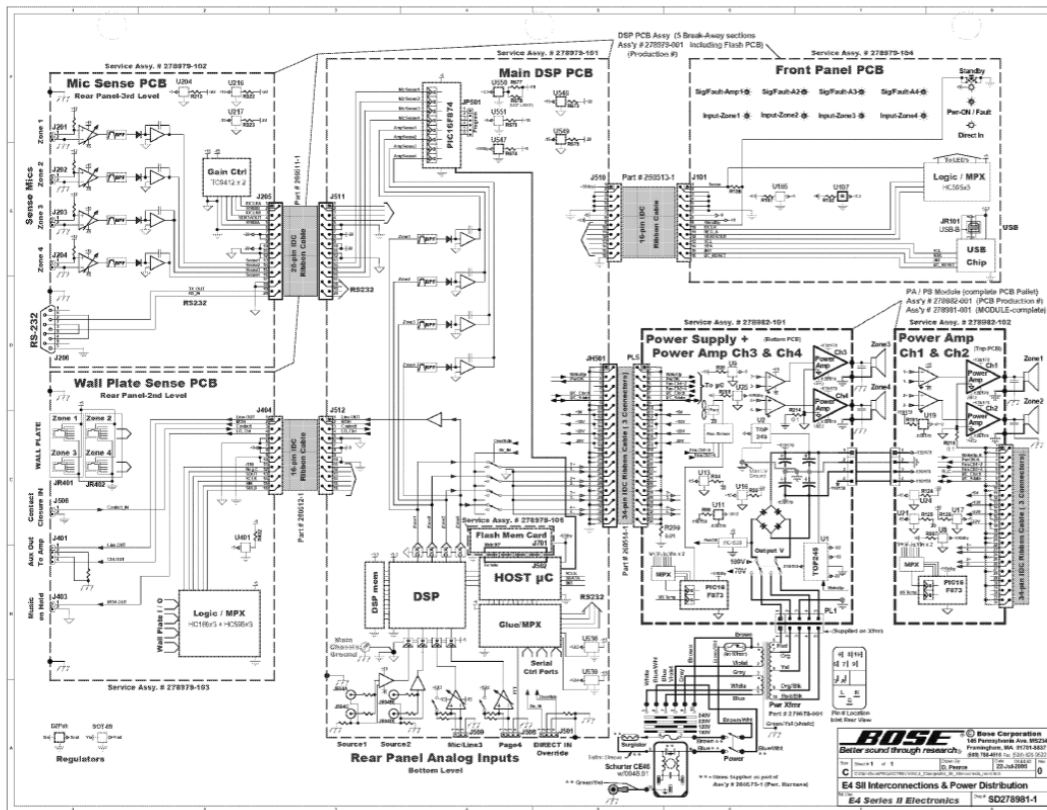
Page 1

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

BOSE_SUB-0000150

BOSE_SUB-0000150.

Contains Highly Confidential AEO and Source Code Materials



HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

BOSE_SUB-0000157

BOSE_SUB-0000157.

639. I understand that Sonos does not meaningfully dispute that Bose LifeStyle discloses this claim limitation. Specifically, I understand that Google served an interrogatory requesting Sonos's contentions for why Claim 1 of the '885 patent is not invalid over Bose Lifestyle. I have reviewed Sonos's response ("Validity Contentions") as it relates to Bose Lifestyle and Sonos does not dispute this claim limitation. *See* Validity Contentions (Attachment A to Sonos's Supp. Rsp. To Google's First Set of Rqs) at 89.

(iv) *Limitation 1.3: "a non-transitory computer-readable medium; and"*

640. In my opinion, the Bose Lifestyle discloses this claim limitation. For example, the Bose Lifestyle stores on a non-transitory computer-readable medium firmware that it executes. The Bose Lifestyle also automatically monitors and adjusts the volume to let users hear soft

Contains Highly Confidential AEO and Source Code Materials

sounds, and prevents a user from being overwhelmed.

Automatic sound level monitoring and control

Your enjoyment of movies is enhanced by Digital Dynamic Range® compression. This technology automatically monitors and adjusts the volume to let you to hear soft sounds, particularly dialogue, but prevents you from being overwhelmed by loud special effects. This is especially useful for late night viewing – it eliminates the need to constantly adjust the volume.

Id. at 4.

When you place your speakers according to the guidelines below, a combination of reflected and direct sound provides the audio atmosphere of a home theater. You may experiment with the placement and orientation of the Jewel Cube® speakers and Acoustimass® module to produce the sound most pleasing to you. For more discussion of speaker placement and room acoustics, see “Fine-tuning your system” on page 36.

Id. at 6.

641. I understand that Sonos does not dispute that Bose LifeStyle discloses this claim limitation. Specifically, I understand that Google served an interrogatory requesting Sonos’s contentions for why Claim 1 of the ’885 patent is not invalid over Bose LifeStyle. I have reviewed Sonos’s response (“Validity Contentions”) as it relates to Bose LifeStyle and Sonos does not dispute this claim limitation. *See* Validity Contentions (Attachment A to Sonos’s Supp. Rsp. To Google’s First Set of Rqs) at 90.

(v) *Limitation 1.4: “program instructions stored on the non-transitory computer-readable medium that, when executed by the one or more processors, cause the first zone player to perform functions comprising:”*

642. In my opinion, the Bose LifeStyle discloses this claim limitation. For the reasons stated above with respect to Limitations 1.2 and 1.3, Bose LifeStyle includes program instructions stored on the non-transitory medium that when executed by the processors perform the functions discussed in the following claim limitations, as described below. Bose LifeStyle may be

Contains Highly Confidential AEO and Source Code Materials

programmed and updated, and once programmed and/or updated, Bose LifeStyle may execute the instructions that are stored on the Bose LifeStyle.

643. I understand that Sonos does not dispute that Bose LifeStyle discloses this claim limitation. Specifically, I understand that Google served an interrogatory requesting Sonos's contentions for why Claim 1 of the '885 patent is not invalid over Bose LifeStyle. I have reviewed Sonos's response ("Validity Contentions") as it relates to Bose LifeStyle and Sonos does not dispute this claim limitation. *See* Validity Contentions (Attachment A to Sonos's Supp. Rsp. To Google's First Set of Rqs) at 90.

(vi) *Limitation 1.5: "while operating in a standalone mode in which the first zone player is configured to play back media individually in a networked media playback system comprising the first zone player and at least two other zone players:"*

644. In my opinion, Bose LifeStyle discloses this claim limitation.

645. For example, the Bose LifeStyle allows for automatic sound level monitoring and control.

Automatic sound level monitoring and control

Your enjoyment of movies is enhanced by Digital Dynamic Range® compression. This technology automatically monitors and adjusts the volume to let you to hear soft sounds, particularly dialogue, but prevents you from being overwhelmed by loud special effects. This is especially useful for late night viewing – it eliminates the need to constantly adjust the volume.

Id. at 4.

When you place your speakers according to the guidelines below, a combination of reflected and direct sound provides the audio atmosphere of a home theater. You may experiment with the placement and orientation of the Jewel Cube® speakers and Acoustimass® module to produce the sound most pleasing to you. For more discussion of speaker placement and room acoustics, see "Fine-tuning your system" on page 36.

Id. at 6.

646. Further, it is my opinion that Bose LifeStyle allows the ability to play audio through

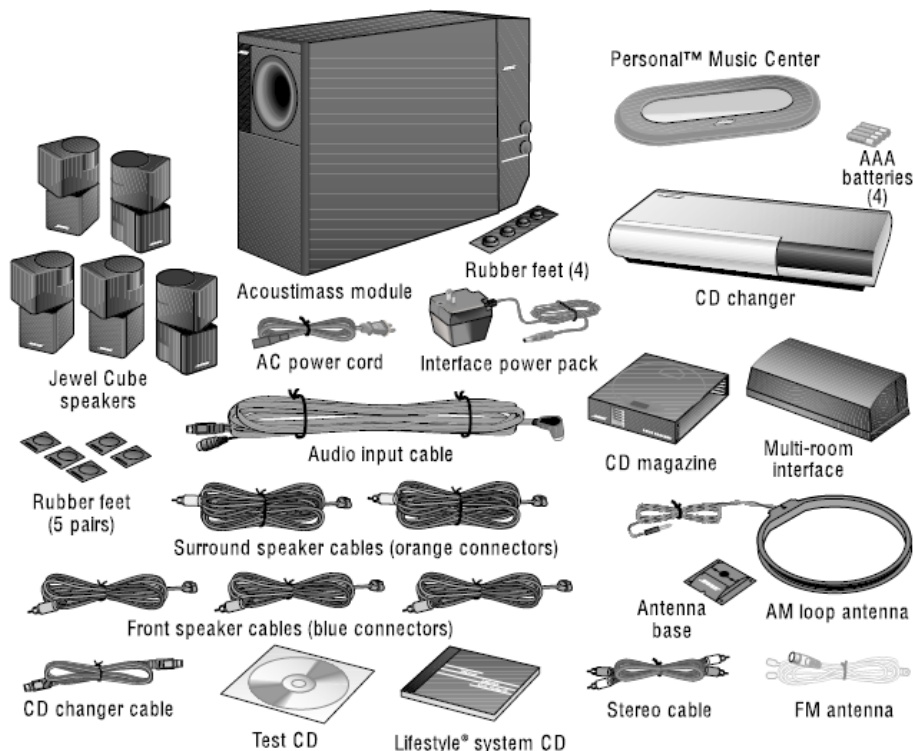
Contains Highly Confidential AEO and Source Code Materials

multiple Jewel Cube speakers.

Figure 1

What comes with your Lifestyle® 50 system:

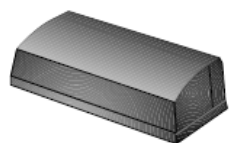
- Personal music center
- CD changer
- Multi-room interface
- Interface power pack*
- 5 Jewel Cube® speakers
- 5 speaker cables
- Acoustimass module
- AC power (mains) cord*
- 14 self-adhesive rubber feet (4 for the module and 5 pairs for the Jewel Cube speakers)
- Audio input cable
- CD changer cable
- Stereo cable
- 4 AAA batteries
- FM antenna
- AM loop antenna
- AM antenna base
- CD magazine
- Lifestyle® system CD
- Test CD



BOSE_SUB-0000007.

Figure 5

The multi-room interface



Multi-room interface

Select a location for the multi-room interface. It may be placed out of sight if you like.

1. Place the multi-room interface within 30 feet (9.1 m) of the Acoustimass module (the length of the audio input cable).
2. Place the multi-room interface close enough to the sound sources (TV, VCR, DVD, etc.) to allow for cable length. If you need additional audio and/or video cables to connect all of your components, see your dealer or call Bose® Customer Service.

BOSE_SUB-0000010.

647. More specifically, Bose LifeStyle allows for connecting the Jewel Cube speakers to the Acoustimass module in order to control the Jewel Cube speakers.

Contains Highly Confidential AEO and Source Code Materials

Connecting the Jewel Cube® speakers to the Acoustimass® module

1. Match each cable to the corresponding speaker location.
 - Front speaker cables have blue RCA connectors at one end, with L, R, or C molded into both the RCA connectors and the Jewel Cube connectors at the other end.
 - Surround speaker cables have orange RCA connectors at one end, with L or R molded into both the RCA connectors and the Jewel Cube connectors at the other end.
2. Insert the Jewel Cube connector of each cable fully into the jack on the rear of one of the five speakers (Figure 7). Match the ridge of the connector to the notch at the top of the jack.
3. Connect each cable to the corresponding jack on the Acoustimass module (Figure 8).
 - Plug the blue connectors into the matching left front, center, and right front jacks.
 - Plug the orange connectors into the matching left surround and right surround jacks.

To lengthen the cable, connect speaker wire with male phono (RCA) plugs on each end to your supplied speaker cable. Use a female-to-female adapter ("barrel" connector). Or, splice in 18-gauge (.75 mm²) or thicker cord (connecting + to + and – to –). To purchase extension wire, see your dealer or electronics store, or call Bose® Customer Service.

Connecting the Acoustimass® module to the multi-room interface

Connect the module to the interface with the audio input cable (Figure 8).

1. Insert the right-angle multi-pin connector on the audio input cable into the AUDIO INPUT jack on the module. Align the connector at the angle shown in Figure 8.
2. Plug the small black multi-pin connector (flat side facing up) into the jack marked ROOM A (PRIMARY) on the back of the interface.

🎵 **Note:** The female RCA connector on the audio input cable is for connecting the digital output of a DVD player or other digital source to the system. See "Setting up a digital sound source" on page 12.

🎵 **Note:** Be sure that each connector is inserted completely into each jack.

For information on connecting multi-room systems, see "Connecting additional rooms" on page 40.

Connecting the CD changer to the multi-room interface

Connect the CD changer to the interface with the CD changer cable (Figure 8).

1. Plug a blue multi-pin connector (flat side facing up) into the jack marked BOSE CD on the back of the interface.
2. Plug the other blue multi-pin connector (flat side facing left) into the jack marked BOSE CD on the back of the CD changer.

BOSE_SUB-0000011-12.

648. Bose LifeStyle also allows a user to setup a personal music center, which further bolsters my opinion that this claim limitation is met.

Contains Highly Confidential AEO and Source Code Materials

Setting up the Personal™ music center

Set up the Personal music center after the rest of the system is connected and plugged in.

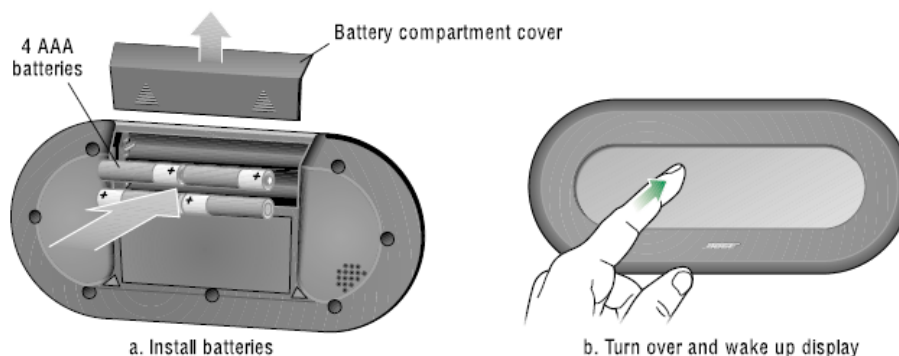
Note: When batteries are first installed in the music center, it sets up a radio-frequency link with the closest multi-room interface.

1. Hold the music center within a few feet of the multi-room interface.
2. Slide open the battery compartment on the back of the music center (Figure 17).
3. Insert 4 AAA or IEC-R03 1.5V batteries, or the equivalent, as shown. Match the + and – symbols on the batteries with the + and – markings inside the compartment.
4. Slide the battery compartment cover back into place.
5. Turn the music center over and touch the screen to wake it up if it appears blank. Press ON/OFF, FM, or any other source button to turn the system on.

If the music center continuously displays “NO RESPONSE,” you need to try to establish its link with the multi-room interface again. Hold the music center close to the multi-room interface. Press and hold MUTE for about 5 seconds until you hear a beep and then release. After about 10 seconds, the music center should beep twice to confirm that the link is established.

Figure 17

Installing batteries and waking up the display for the first time



Note: Replace the batteries when the LOW BATTERY message first appears. See “Replacing batteries” on page 44. Alkaline batteries are recommended.

BOSE_SUB-00000019.

Turning on the system

You are ready to enjoy your new Lifestyle® system. Your Personal™ music center places complete control of the system operations in your hands. The center is portable, communicating with the rest of the system through a two-way radio-frequency link. The display is backlit for easy viewing, and provides visual feedback of current system operations and available options. To allow for maximum battery life, the display and backlight turn off a short time after your last button press. You only need to touch the screen to wake up the music center.

- To learn more about the display, see “Using the Personal music center display” on pages 20-21.
- To operate the AM/FM radio, see “Listening to the radio” on pages 26-28.
- To operate the CD changer, see “Listening to compact discs” on pages 29-34. To verify your system setup, listen to the instructions on the Test CD.
- To control external components, see “Using the system with external components” on page 35.
- To use your system in multiple rooms, see “Operating in more than one room” on pages 41-43.

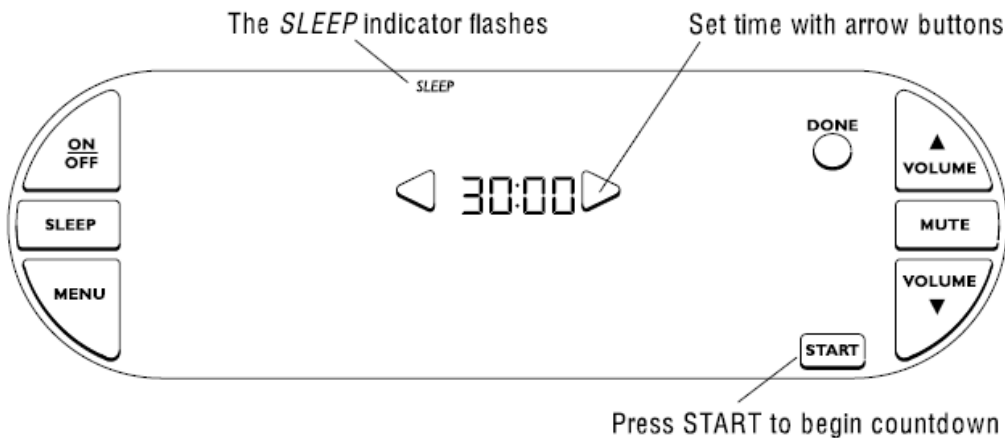
Id. at 20.

Contains Highly Confidential AEO and Source Code Materials

Using the sleep timer

- Press the SLEEP button to access the sleep timer for automatic shutoff. The display flashes a sleep time of 30 minutes or the most recent sleep time setting (Figure 20). The *SLEEP* indicator is also flashing.
- Use the arrow buttons to set the sleep timer to 1 to 99 minutes.
- Press the START button to start the counter. The START button disappears and a CLEAR button appears at the bottom of the display.

Before pressing START ...



Id. at 21.

649. Bose LifeStyle allows a user to setup audio playback for multiple rooms, while selecting other rooms using the Personal music center.

Contains Highly Confidential AEO and Source Code Materials

Setting Up Your Lifestyle® Stereo Amplifier

Multi-room interface setup

English

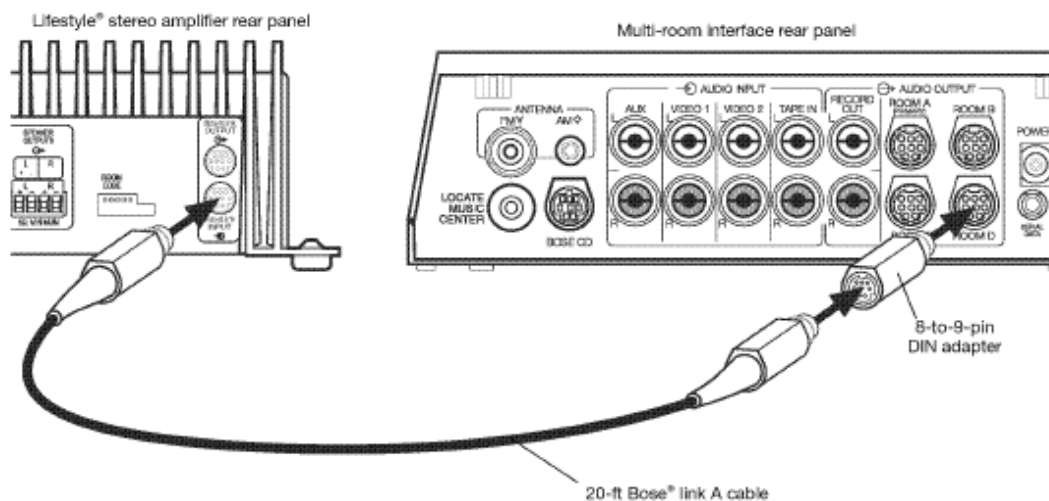
CAUTION: Before making any connections, turn the Lifestyle® system off and disconnect the music center from the AC (mains) power outlet. DO NOT plug the amplifier into an outlet until you have completed all other connections.



1. Insert the 8-to-9-pin adapter into one of the unused ROOM output connectors (B, C, or D) on the rear of the multi-room interface (Figure 10).
2. Insert one end of the Bose® link A cable into the 8-to-9-pin adapter.
3. Insert the other end of the Bose® link A cable, into the Bose® link input connector on the rear panel of the Lifestyle® stereo amplifier.

Figure 10

Lifestyle® stereo amplifier
to multi-room interface
connections



Contains Highly Confidential AEO and Source Code Materials

(vii) *Limitation 1.6: “(i) receiving, from a network device over a data network, a first indication that the first zone player has been added to a first zone scene comprising a first predefined grouping of zone players including at least the first zone player and a second zone player that are to be configured for synchronous playback of media when the first zone scene is invoked; and”*

650. In my opinion, the Bose LifeStyle discloses this claim limitation.

651. Sonos discussed this claim limitation, in part, in its summary judgment briefing. As I discussed *supra* in Section X.A, Sonos argued that adding a speaker to a speaker group via a controller and sending an “indication” that need not include the “zone scene” or the players in that zone scene is sufficient to meet this claim element.

652. Bose Lifestyle discloses this behavior. As discussed above and further below, Bose LifeStyle allows for the addition of multiple rooms and zones to the be added to the Lifestyle ecosystem.

Contains Highly Confidential AEO and Source Code Materials

Setting Up Additional Rooms For Sound

English

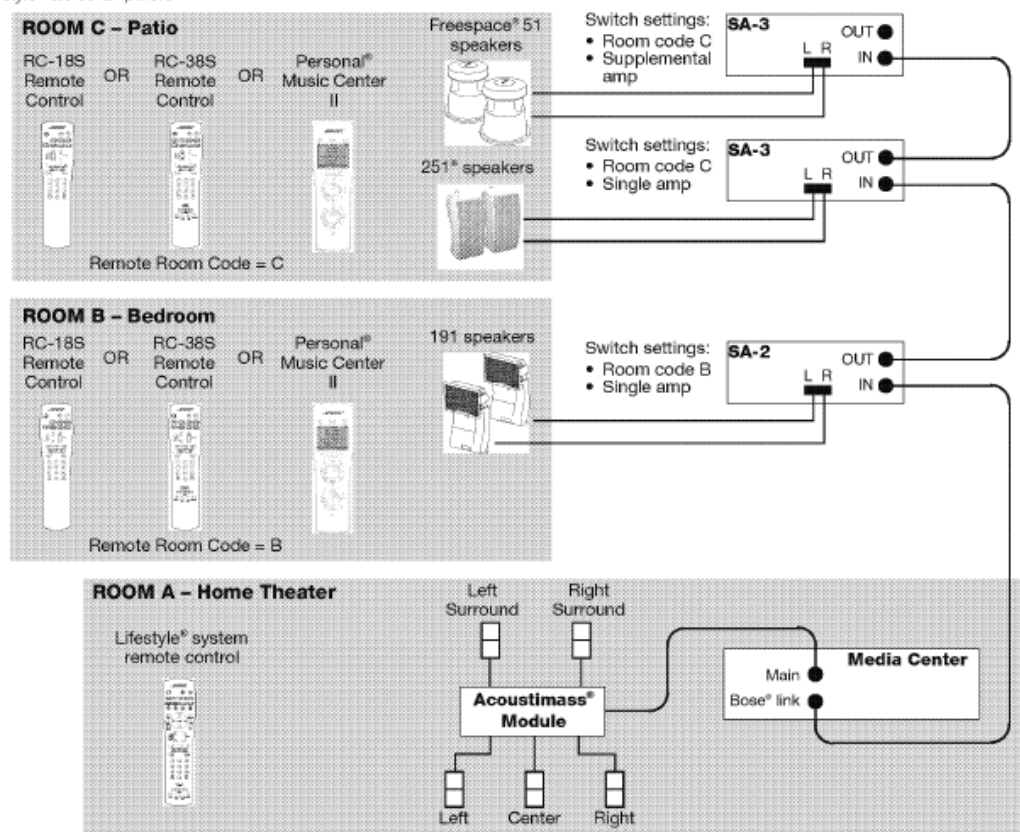
Setup guidelines for additional rooms

If you have a Lifestyle® 18 series II, 28 series II, 38 or 48 home entertainment system, you can experience stereo sound in up to 14 other rooms using Lifestyle® stereo amplifiers, compatible speaker systems and remote controls for the other rooms.

- Remote controls for other rooms must be set to the same house code as the main room remote, but each remote must be set to a different room code. See "Setting up remote controls for other rooms" on page 23.
- The Lifestyle® amplifier and its remote control must be set to the same room code. See "Setting up the amplifier room code" on page 24.
- When using more than one amplifier to power more than two speakers in a room (Figure 18, room C), all amplifiers must be set to the same room code. Also, one amplifier must be set to the single amp mode and all others must be set to the supplemental amp mode. See "Single and supplemental amplifiers" on page 25.

Figure 18

Sample installation of
Lifestyle® stereo amplifiers



Contains Highly Confidential AEO and Source Code Materials

Setting Up Additional Rooms For Sound

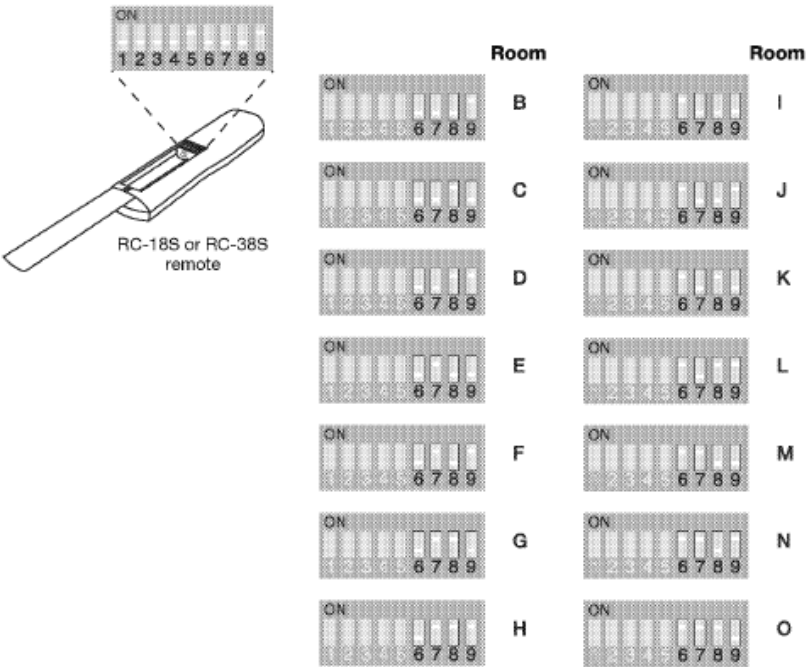
Setting up remote controls for other rooms

To set up the RC-18S or RC-38S remote:

- 1. Remove the remote control battery cover and locate the microswitches (Figure 19).
- 2. Make sure that the house code settings (switches 1, 2, 3, and 4) match the house code settings in your main room remote.
- 3. This remote is shipped from the factory set for room B. If this remote is used beyond a second room, set switches 6, 7, 8, and 9 to the same room code as set in the Lifestyle® stereo amplifier.

Note: Refer to your Lifestyle® system owner's guide for more information on operating your system in more than one room.

Figure 19
Microswitch settings for RC-18S and RC-38S remotes

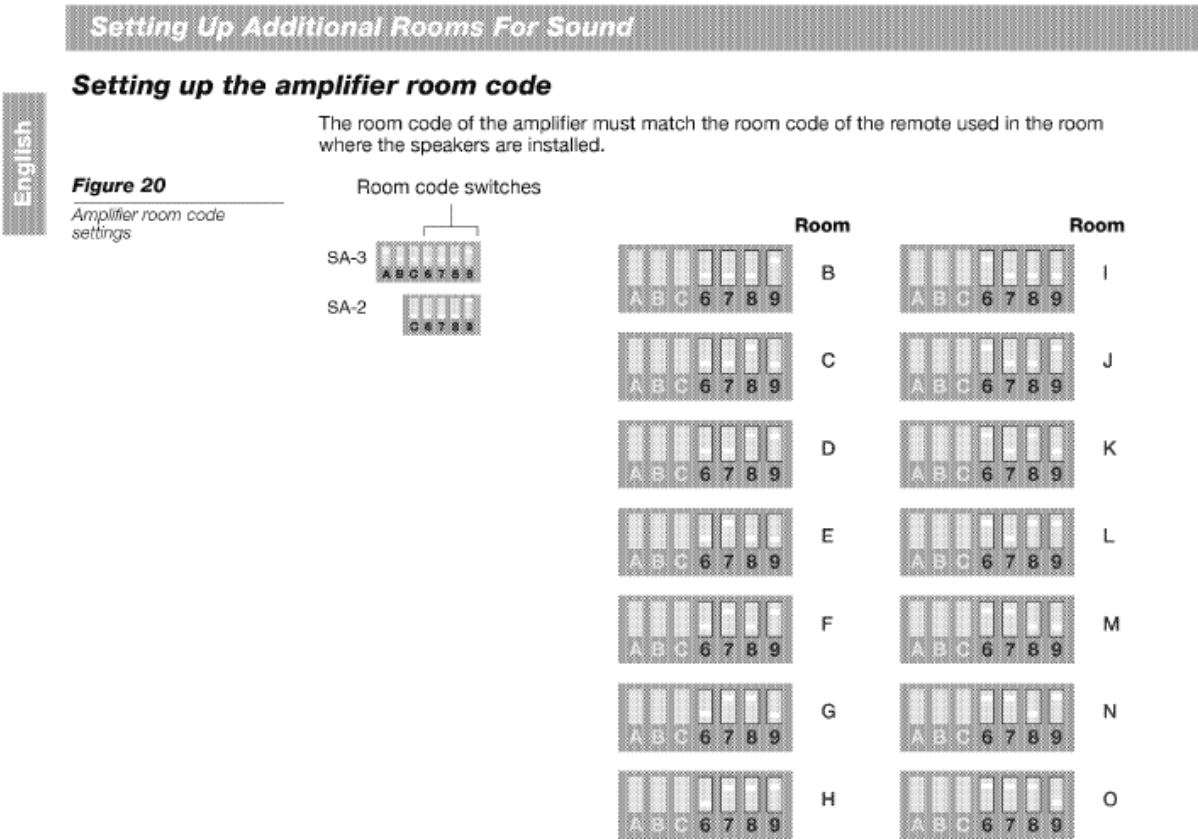


To set up the Personal® music center II:

Refer to the owner's guide included with the Personal® music center II for instructions on configuring this remote for other rooms.

English

Contains Highly Confidential AEO and Source Code Materials



BOSE_SUB-0000386.

653. Then, as also mentioned before, the Bose Link communication protocol allows for

Contains Highly Confidential AEO and Source Code Materials

an indication that additional rooms, for example, have been added to the media center. The Bose Link connection is essentially a conversation between the media center and the expansion device. The media center sends on/off, volume and source change commands along with audio to the zones. The zones then respond by sending information back to the media center to let it know that the zone is still active. Importantly, as described below, the media center will not acknowledge commands from any zone that is not targeted or invoked (BOSE_SUB-0000596).

Contains Highly Confidential AEO and Source Code Materials



Company Confidential



What is Bose Link?

Bose link is a communication protocol. To communicate there must be at least two participants that speak the same language. To Bose products, Bose link is that language.

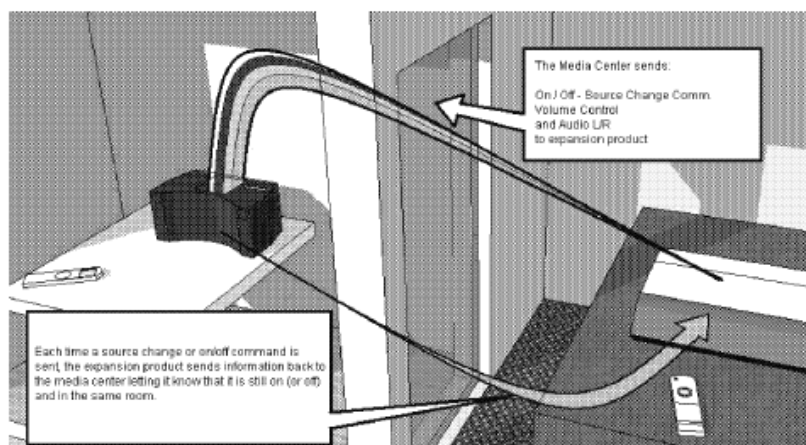
Rooms

There are 15 different rooms that can be controlled by a Bose link enabled media center. The main room – labeled room A – is reserved for the Lifestyle speaker components. The other rooms – rooms B-O – are reserved for expansion via Bose link.

For a Bose link setup to work the system must include a Bose link enabled media center (a controller), a Bose link expansion product, and an expansion remote control. Both the expansion product and the remote must be configured to operate on the same room.



A Bose link connection is essentially a conversation between the media center and the expansion device. The media center sends on/off, volume and source change commands along with audio to the expansion product. The expansion product responds by sending information back to the media center to let it know that it is still on (or off) and in the same room. This information exchange occurs each time a power or source change command is issued by the expansion remote.



When the media center receives an ON command from an expansion remote the system turns on and checks for any Bose link products that might be connected, but it will only look for Bose link products that are assigned to the same room as the remote.

Understanding Bose® link

Page 2 of 8

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

BOSE_SUB-0000595

BOSE_SUB-0000595.

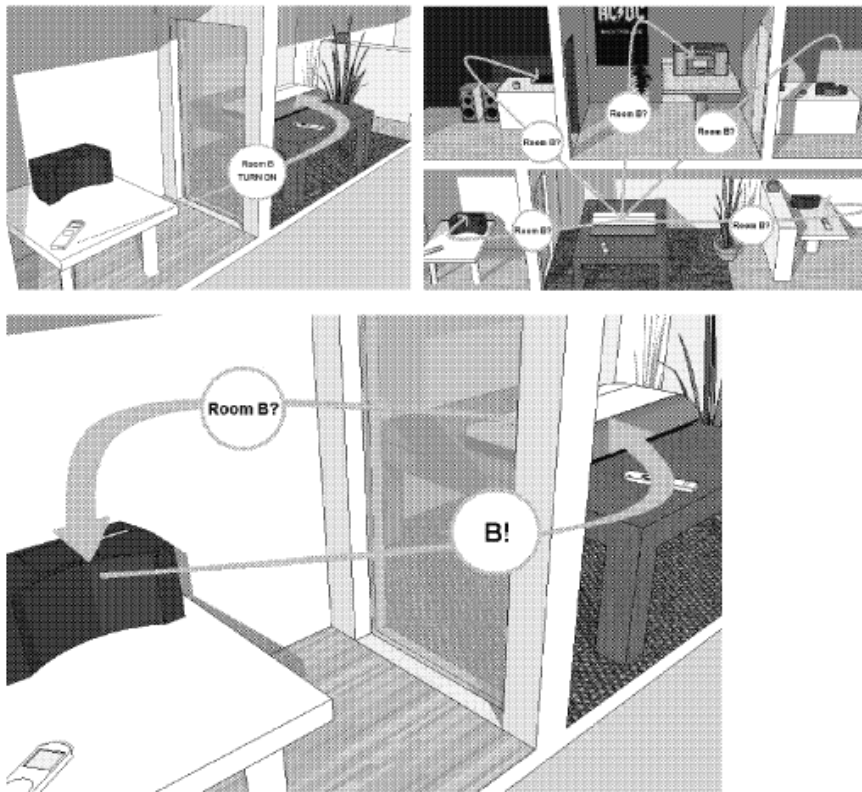
Contains Highly Confidential AEO and Source Code Materials



Company Confidential



If the media center receives a command from a remote configured for room B, for example, the media center calls out to other Bose link products which might be assigned to room B. If a connected expansion product is assigned to room B it will respond to the media center and a Bose link connection will be made. The media center will not acknowledge a response from anything not assigned to room B.



The media center will not acknowledge more than one response from the same room, either. As with any productive conversation, there can only be one person speaking at a time. If more than one product is assigned to room B the media center won't know which one to listen to. If the media center can't understand the response from the expansion products, or if there is no response at all, the media center will turn itself off and the Bose link connection will not be successful.

Understanding Bose® link

Page 3 of 8

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

BOSE_SUB-0000596

BOSE_SUB-0000596.

Contains Highly Confidential AEO and Source Code Materials

(viii) *Limitation 1.7: “(ii) receiving, from the network device over the data network, a second indication that the first zone player has been added to a second zone scene comprising a second predefined grouping of zone players including at least the first zone player and a third zone player that are to be configured for synchronous playback of media when the second zone scene is invoked, wherein the second zone player is different than the third zone player;”*

654. In my opinion, Bose Lifestyle discloses or renders obvious this claim limitation.

655. I incorporate by reference my discussion of limitation 1.6 herein, which discloses receiving from a network device an indication that the zone player has been added to a zone scene comprising a predefined grouping of zone players that are to be configured for synchronous playback of media when the zone scene is invoked. Limitation 1.7 adds the limitation that the first zone player is a member of two different “zone scenes.”

656. In addition to the evidence disclosed in Limitation 1.7, the Bose Lifestyle expressly teaches managing two separate streaming sources at one time, such that room A can operate on stream 1, and room B can operate stream 2, for example.

Contains Highly Confidential AEO and Source Code Materials



Company Confidential



Streams

A Bose link enabled media center is also capable of managing two separate sources at the same time. Each source can be sent to one of two different outputs - or 'streams' - within the Bose link connection. 4 of the 9 pins that make up the Bose link connection on the back of the media are responsible for delivering these streams - all of which are analog. Two pins are reserved for stream 1 audio L/R (fixed), and another two pins carry stream 2 audio L/R (fixed) - (there is another pair of pins that carry variable stream 2 audio that will be discussed later). Every Bose link expansion product has 2 inputs to accommodate each stream, and the remote control tells the device which stream to listen to. The expansion products receive fixed audio and then control volume via commands they receive from the media center carried on other pins.

Here is an example:

If an expansion remote configured for stream 1 sends an ON command to the media center, the media center will activate the pins that carry stream 1 information. The media center will also call out to any Bose link product set to the same room code as the remote. If the media center gets an answer it can understand, it will respond by telling the expansion product to turn on and listen to its stream 1 inputs. If the media center does not get a response from an expansion product set to the same room as the remote it will simply turn itself off.

The main room, or room A, can only operate on stream 1. Although any of the expansion rooms can be configured to operate on either stream 1 or stream 2, expansion rooms are generally assigned to stream 2. Since only one source can be sent to each stream at any given time, keeping Bose link expansion products on stream 2 prevents changes made in expansion rooms from affecting what is being played in the main room, and vice-versa.

BOSE_SUB-0000597.

1) Obviousness – POSITA

Contains Highly Confidential AEO and Source Code Materials

657. In the alternative, this claim element discloses nothing more than overlapping speaker groups, which would have been obvious to a person of skill in the art at the time. Indeed, the Bose LifeStyle already disclosed having groups and dynamic reallocation of those groups, which indicates to a person of skill in the art that overlapping group membership is desirable, consistent with Sonos's arguments in its summary judgment briefing. A POSITA would have been motivated to add overlapping groups because Bose LifeStyle's own marketing materials touted the flexibility of its system to allow users to play back media throughout their household. *Supra*.

658. A person of skill in the art would have recognized that by allowing a user to create speaker groups, those groups may either (1) allow overlapping group membership or (2) not allow overlapping group membership. Given that allowing overlapping group membership may be attractive to certain users because there was a recognized "need for dynamic control of the audio players as a group," it would have been obvious to select allowing overlapping group membership when implementing speaker groups. '885 Patent at 1:30-34.

1) Obviousness – Nourse

659. A person of skill in the art would also have been motivated to combine the Bose LifeStyle with Nourse, which discloses a plurality of speakers, each of which has "a unique 16-bit address." Nourse, 3:57-58. "Each of the speakers also can be assigned up to four group identifiers." *Id.* at 3:58-59. The group identifier "allows specific speakers to be assigned to a group and receive the same signal." *Id.* at 3:61-63. Thus, any speaker "can be assigned to more than one group." *Id.* at 4:5. Nourse is analogous to the '885 patent because it is in the same field of endeavor, "controlling or manipulating a plurality of multimedia players in a multi-zone system." '885 Patent, 1:30-34. For example, Nourse, like the '885 patent, explains that it is directed to "a centralized speaker system that allows multiple speakers connected to a central amplifier speaker line to be monitored and controlled from a central location via a master/slave protocol." Nourse at

Contains Highly Confidential AEO and Source Code Materials

Abstract. Nourse is also reasonably pertinent to the problem to be solved by the '885 patent, which is “dynamic control of the audio players as a group.” For example, Nourse explains that speakers may be “addressed individually or as part of a group” by “receiving unique content specific, respectively, to the individual remote speaker address and group address” (*id.* at 2:35-39) where the group address or identifier “allows specific speakers to be assigned to a group and receive the same signal” and play back audio as a group (*id.* at 3:61-63). Nourse teaches additional means for improving the user experience by allowing a user to add a playback device to multiple groups. Nourse at 3:57-4:5. It would have been desirable to allow a user to have a particular zone player join multiple groups (e.g., the kitchen and patio could be grouped for outside entertainment, and the kitchen and living room could be grouped for inside entertainment). Having a speaker join multiple groups would increase the number of customized combinations a user could configure in their home, as the Bose LifeStyle recognizes as an important feature. Nourse is also analogous to the Bose LifeStyle system as both relate to digital speaker systems with dynamic grouping features.

1) Obviousness – Rajapakse (US 8,239,559)

660. A person of skill in the art would have found it obvious to combine Rajapakse with Bose LifeStyle. Rajapakse was cited by many Sonos patents regarding speaker grouping, including patents from the same family as the '885 Patent, indicating that persons of skill in the art recognized that Rajapakse was highly relevant to the claimed features. For example, Mr. Lambourne in prosecuting US 2013/0251174 disclosed Rajapakse as relevant prior art. 2014-04-17 Information Disclosure Statement. Rajapakse was also cited by the following patents—which are closely related to the '885 patent.

US20130251174A1	Sonos, Inc.	Controlling and manipulating groupings in a multi-zone media system
US8788080B1	Sonos, Inc.	Multi-channel pairing in a media system
US9226087B2	Sonos, Inc.	Audio output balancing during synchronized playback
US9226073B2	Sonos, Inc.	Audio output balancing during synchronized playback

Contains Highly Confidential AEO and Source Code Materials

US9456279B1	Google Inc.	Automatic control and grouping of media playback devices based on user detection
US9671997B2	Sonos, Inc.	Zone grouping
US9729115B2	Sonos, Inc.	Intelligently increasing the sound level of player
US10209948B2	Sonos, Inc.	Device grouping
US10306364B2	Sonos, Inc.	Audio processing adjustments for playback devices based on determined characteristics of audio content
US10331399B2	Apple Inc.	Smart audio playback when connecting to an audio output system
US10356526B2	Razer (Asia-Pacific) Pte. Ltd.	Computers, methods for controlling a computer, and computer-readable media
US10516718B2	Google LLC	Platform for multiple device payout
US11265652B2	Sonos, Inc.	Playback device pairing

661. Rajapakse discloses this claim element.

662. For example, Rajapakse discloses dynamic playback among many speakers in groups. 13:41-45 (“There may be multiple streams of audio being sent to multiple media renderers 203 in multiple zones at the same time. . . As an example, a media renderer may be the front left channel when a movie is being played to a screen that is centered between it and the front right. This would be configured as default movie stream. This same media renderer may be configured also to be the back left channel when playing a default HiFi audio stream, where hi performance front media renderers are positioned elsewhere in the room.”).

663. Rajapakse also discloses synchronized playback in speaker groups. 11:60-65 (“The rendition of each stream by a media renderer 203 (speaker) needs to be synchronized in time. This is enabled by the distribution server 204 working with the media renderer 203, using a stream protocol specific to the media renderers 203. This protocol includes the methods to time-synchronize rendition of the stream.”).

664. Rajapakse discloses dynamic grouping and transitioning speakers among different groups. 3:65-67 (“If the user and media source 101 move to the dining room that also has a set of destination devices 103 present, it is desirable for music playback from the media source 101 to transition to this new set of destination devices 103 automatically and without interruption.”).

Contains Highly Confidential AEO and Source Code Materials

665. Rajapakse discloses that each player/speaker may be a part of multiple groups. 4:47-54 (“Each media renderer 203 is set up with a variety of properties including lists of acceptable zone identifications, acceptable zone manager identifications, acceptable zone 50 control point identifications, lists of acceptable stream identifications, rendition properties such as volume and role properties.”).

666. Rajapakse discloses having many properties for players within a speaker group and therefore discloses “zone scenes.” 4:53-67 (“One of these properties, the 'role' of a media renderer 203, can define what stream channel the media renderer 203 will 55 play back. Each audio data stream may include multiple channels, where each channel is defined as front left, center, front right, back left, back center, back right, subwoofer, etc. The media renderer 203 can be configured to accept one of the channels in the stream. If the stream does not contain the channel the media renderer 203 is configured for, it may be configured to play an alternate channel or not play anything. In addition to the channel type roles, a media renderer's role may include other 'roles.' A media renderer's role could be to play only deep base sounds, or to play only high pitch sounds in the media. As another example, a media renderer's role may be to provide special effects, such as echoes or background sounds. As a further example, a media renderer's role may be to play pre-recorded media segments at various points of the media stream. For example, a media renderer 203 may play pre-recorded media segments on initiation by a control point or zone manager, or based on sensing various states or conditions, such as powering up the media renderer, or detecting a sensor condition.”).

667. Rajapakse discloses overlapping groups or zones, and therefore overlapping speakers within those zones. 5:61-67 (“A zone is a physical space that a number of media renderers belong to and within which the media renderers are physically located. Typically a zone is a listening space, a space where the audio from all the media renderers in the space can be heard.

Contains Highly Confidential AEO and Source Code Materials

For example, all media renderers within a single auditorium will be in the same zone. Zones may overlap and may include other zones.”).

668. Rajapakse discloses that speakers may be a member of more than one group. 6:1-4 (“Each media renderer 203 is assigned to one or more zones. Zones are typically identified with a Zone Identifier (ZID).”).

669. Rajapakse discloses dynamic zone and speaker management. 6:6-19 (“The zone manager 210 dynamically gathers and aggregates information on the media renderers 203 in its vicinity and makes this information available to other services. . . . In addition to gathering media renderer information, the zone manager 210 holds information specific to a zone, manages the media renderers 203 in the zone, and may provide additional services and actions, such as media renderer reservation to other services such as control points 201. . . . The zone control point 209 is an enhanced version of a standard control point 201. The enhancements allow the zone control point 209 to interact with the zone manager 210 to quickly gather information on sets of media renderers 203 in a zone and perform actions on the zone.”).

670. Rajapakse discloses zone management that is dynamic. 12:51-59 (“Once a zone manager 210 registers a media renderer 203, the zone manager 210 may view and modify the media renderer's setup by interacting with a user directly or via a control point 201. This includes modifying the media renderer's zone list, default stream list, role, and properties such as volume.”).

1) Obviousness – Millington

671. A person of skill in the art would have been motivated to combine Millington with the Bose LifeStyle because Mr. Millington worked on Sonos products that are in the same field of endeavor as the Bose LifeStyle, and therefore it would have been an obvious choice to look to for guidance about potential modifications to that system. Mr. Millington’s patents also described aspects of the Sonos System or aspects related to how those systems practice group

Contains Highly Confidential AEO and Source Code Materials

synchronization and therefore a POSITA would have looked to Millington to understand the Sonos System or its competitors, like Bose LifeStyle. Millington was also assigned to Sonos and was filed in the same timeframe as the Sonos System was released.

672. Millington discloses this claim element.

673. Millington discloses standalone speakers and synchronous groups. Millington at 6 (“In the following, the term "synchrony group" will be used to refer to a set of one or more zone players that are to play the same audio program synchronously. Thus, in the above example, zone players 11(1) and 11(2) comprise one synchrony group, zone player 11(3) comprises a second synchrony group, zone players 11(4) and 11(5) comprise a third synchrony group, and zone player 11(6) comprises yet a fourth synchrony group. Thus, while zone players 11(1) and 11(2) are playing the same audio program, they will play the audio program synchronously.”); *Id.* (“Similarly, while zone players 11(4) and 11(5) are playing the same audio program, they will play the audio program synchronously.”).

674. Millington discloses using dynamic groups. Millington at 7 (“In the network audio system 10, the synchrony groups are not fixed. Users can enable them to be established and modified dynamically. Continuing with the above example, a user may enable the zone player 11(1) to begin providing playback of the audio program provided thereto by audio information source 14(1)(1), and subsequently enable zone player 11(2) to join the synchrony group. Similarly, a user may enable the zone player 11(5) to begin providing playback of the audio program provided thereto by audio information source 14(5)(2), and subsequently enable zone player 11(4) to join that synchrony group. In addition, a user may enable a zone player to leave a synchrony group and possibly join another synchrony group. For example, a user may enable the zone player 11(2) to leave the synchrony group with zone player 11(1), and join the synchrony group with zone player 11(6). As another possibility, the user may enable the zone player 11(1) to leave the synchrony

Contains Highly Confidential AEO and Source Code Materials

group with zone player 11(2) and join the synchrony group with zone player 11(6). In connection with the last possibility, the zone player 11(1) can continue providing audio information from the audio information source 14(1)(1) to the zone player 11(2) for playback thereby.”); __ (“The system is such that synchrony groups are created and destroyed dynamically, and in such a manner as to avoid requiring a dedicated device as the master device.”).

Millington discloses overlapping speaker groups. Millington at 17 (“As noted above, there may be multiple synchrony groups in the network audio system 10, and further that, for example, a zone player 11(n) may operate both as a master device 21 or a slave device 22(g) in one synchrony group, and as the audio information channel device 23 providing audio and playback timing information and clock timing information for another synchrony group.”); __ (“Indeed, it will be appreciated that the zone player that is utilized as the audio information channel device for synchrony group 20(2) may also be a zone player that is utilized as the master device 21(1) or a slave device 22(1)(1),..., 22(K)(1) in the synchrony group 20(1).”).

(ix) *Limitation 1.8: “after receiving the first and second indications, continuing to operate in the standalone mode until a given one of the first and second zone scenes has been selected for invocation;”*

675. In my opinion, Bose Lifestyle discloses this claim limitation.

676. For example, Bose LifeStyle discloses adding additional zones or rooms to the media center, and then programming each room to be a certain frequency. Put another way, Bose LifeStyle allows a user to add additional speakers to zones of the Bose media center, and if any particular speaker is offline when the connected to the zone, it will remain offline, until invoked for use.

Contains Highly Confidential AEO and Source Code Materials

Setting Up Additional Rooms For Sound

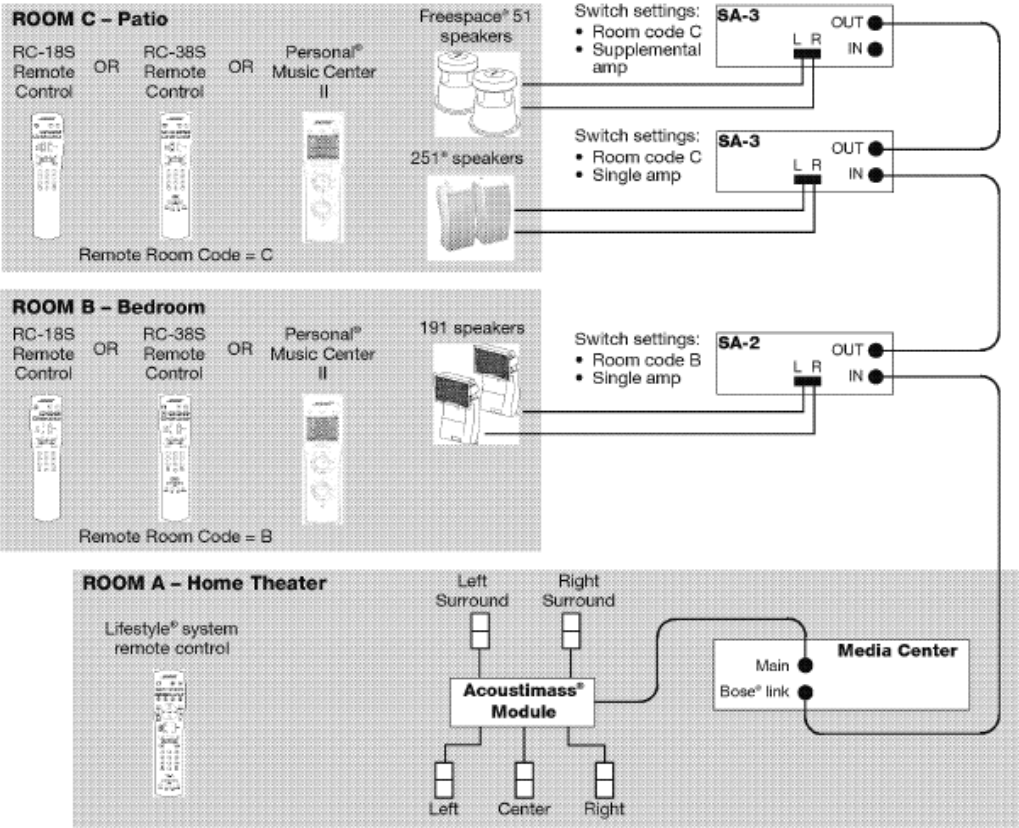
English

Setup guidelines for additional rooms

If you have a Lifestyle® 18 series II, 28 series II, 38 or 48 home entertainment system, you can experience stereo sound in up to 14 other rooms using Lifestyle® stereo amplifiers, compatible speaker systems and remote controls for the other rooms.

- Remote controls for other rooms must be set to the same house code as the main room remote, but each remote must be set to a different room code. See "Setting up remote controls for other rooms" on page 23.
- The Lifestyle® amplifier and its remote control must be set to the same room code. See "Setting up the amplifier room code" on page 24.
- When using more than one amplifier to power more than two speakers in a room (Figure 18, room C), all amplifiers must be set to the same room code. Also, one amplifier must be set to the single amp mode and all others must be set to the supplemental amp mode. See "Single and supplemental amplifiers" on page 25.

Figure 18
Sample installation of
Lifestyle® stereo amplifiers



Contains Highly Confidential AEO and Source Code Materials

Setting Up Additional Rooms For Sound

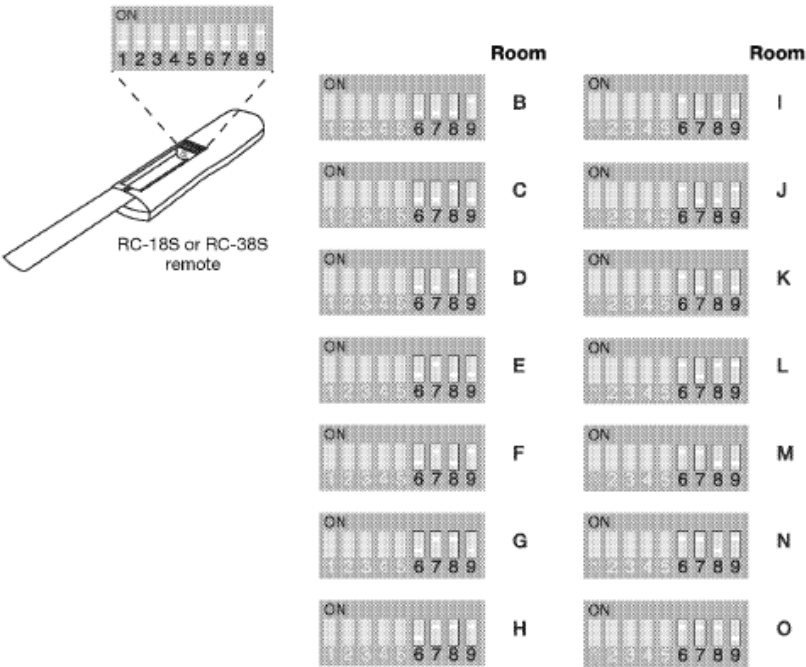
Setting up remote controls for other rooms

To set up the RC-18S or RC-38S remote:

- 1. Remove the remote control battery cover and locate the microswitches (Figure 19).
- 2. Make sure that the house code settings (switches 1, 2, 3, and 4) match the house code settings in your main room remote.
- 3. This remote is shipped from the factory set for room B. If this remote is used beyond a second room, set switches 6, 7, 8, and 9 to the same room code as set in the Lifestyle® stereo amplifier.

Note: Refer to your Lifestyle® system owner's guide for more information on operating your system in more than one room.

Figure 19
Microswitch settings for
RC-18S and RC-38S
remotes



To set up the Personal® music center II:
Refer to the owner's guide included with the Personal® music center II for instructions on configuring this remote for other rooms.

English

BOSE_SUB-0000385.

677. As previously mentioned, Bose LifeSytle allows a user to deliver music to

Contains Highly Confidential AEO and Source Code Materials

additional zones while simultaneously playing music in the main zone. Further, Bose Lifestyle's "room selector" enables a user to target specific zones with the ability to add additional zones to the media center, which will not be brought "online" until the selected by the user.

Contains Highly Confidential AEO and Source Code Materials

LIFESTYLE® SA-2 STEREO AMPLIFIER

PRODUCT POSITIONING

- Our most popular Lifestyle® system expansion stereo amplifier.
- Enjoy Bose® sound throughout your home – from one Lifestyle® system. The Lifestyle® SA-2 stereo amplifier is designed for Lifestyle® system owners who want to enjoy Bose quality music in additional rooms of their home – indoors and outdoors – with their choice of Bose speakers.

HEADLINES

Expand your Lifestyle® system to additional rooms – easily and elegantly.

Introducing the new Lifestyle® SA-2 stereo amplifier from Bose.

Bring Bose® sound to other rooms in your home – from your Lifestyle® system.

Introducing the new Lifestyle® SA-2 stereo amplifier from Bose.

Enjoy Bose® sound here...and there...from your Lifestyle® system.

Introducing the new Lifestyle® SA-2 stereo amplifier from Bose.

Movies in one room. Music in up to 14 additional rooms. All from your Lifestyle® system.

Introducing the new Lifestyle® SA-2 stereo amplifier from Bose.

KEY PRODUCT BENEFITS (IN ORDER OF IMPORTANCE)

- **High-quality sound performance:** Bose patented signal processing circuitry enables full, rich stereo sound, even at low volumes.
- **Easy hookup:** Connects to Lifestyle® systems with a single Bose® expansion cable.
- **Easy, elegant placement:** Small footprint allows amplifier to easily be hidden in a room. Mounting flanges included for mounting to wall or floor joist.
- **Versatility, enabled by Bose® link:**
 - Enables choice between two independent audio streams from the Lifestyle® system (for example, a movie in one room, music in another).
 - Includes expansion output for “daisy-chaining” multiple Lifestyle® amplifiers for up to 14 additional rooms of audio.
 - Each amplifier can be controlled independently with a Lifestyle® expansion remote control (sold separately).

KEY TECHNOLOGIES TO HIGHLIGHT (USE ICONS AS PROVIDED)

- **Bose® link:** A Bose proprietary networking technology that allows for easy, seamless expansion of your Lifestyle® system so you can enjoy different audio sources in different rooms, including outdoors. (“See Bose® link icon on “Technology Icons” page.”)
- **Bose® patented signal processing circuitry:** Automatically adjusts tonal balance at different volume levels. Thus, music sounds lifelike with full, rich lows at almost any listening level, while speech consistently sounds natural.
- **Thermal compression circuitry:** Provides automatic protection for the amplifier electronics. If the amplifier approaches an unsafe operating temperature, the volume level is automatically lowered until a safe temperature is reached. Then, the volume is automatically returned to its original level.

For all copy on this page: CD-ROM folder: copy blocks
CD-ROM file: promocopy.pdf

BOSE_SUB-0000450

BOSE_SUB-0000450.

Contains Highly Confidential AEO and Source Code Materials

LIFESTYLE® SA-2 STEREO AMPLIFIER

ADDITIONAL PRODUCT INFORMATION

DETAILED PRODUCT INFORMATION

- Room selector switches assign the amplifier to a specific room and radio frequency remote control.
- Mini-DIN expansion input and output easily connects multiple Lifestyle® amplifiers to the Lifestyle® media center in a daisy chain, whenever two or more pairs of speakers are desired in a specific location (for example, outdoors or in a large hall).
- Wired Volume Control (VCA) input provides connection for an on-wall volume control (can be used with or in place of a Lifestyle® radio frequency remote control).
- Finned cast aluminum housing dissipates heat efficiently for lower operating temperatures, even at full output.
- Integrated mounting flanges allow for permanent mounting to walls or floor joists, if desired.
- Bose® expansion cable allows for a single connection of the amplifier to the Lifestyle® media center or multi-room interface.
- Dimensions: 4 1/2" H x 14 1/4" W x 5 1/2" D (9 x 36 x 13.8 cm).
- Weight in carton: 7.6 lbs. (3.45 kg).
- Power rating: Two-channel stereo operation, 40 watts (minimum) per channel.
- Speaker impedance: Compatible with speakers rated 6 ohms or higher.
- Color: Black.
- Limited one-year transferable warranty remains with the system even if ownership passes to another person.

OPTIONAL ACCESSORIES

- Lifestyle® radio frequency expansion remote controls (RC-185 for Lifestyle® 18 and 28 Series II systems, RC-38S and Personal® Music Center II for Lifestyle® 38 and 48 systems).

For all copy on this page: CD-ROM folder: *copy blocks*
 CD-ROM file: *promocopy.pdf*

BOSE_SUB-0000451

BOSE_SUB-0000451.

678. That is, Bose Lifestyle allows additional zones to listen to what is being played in

Contains Highly Confidential AEO and Source Code Materials

the main room, or alternatively, something different. Alternatively, Bose LifeStyle allows the user the ability to add additional zones to the media center while audio is played in different zones. The newly added zones will remain offline until targeted or prompted by the user.

Contains Highly Confidential AEO and Source Code Materials

LIFESTYLE® SA-2 STEREO AMPLIFIER

SUGGESTED ADVERTISING SAMPLES

ADVERTISING COPY BLOCK

Attention Lifestyle® system owners: Did you know your Lifestyle® system can deliver music to other areas in your home – even while it's busy playing a DVD movie in the main room? Bose® link expansion capability makes it possible. And the Lifestyle® SA-2 stereo amplifier makes it easy. One simple connection of the SA-2 amplifier to the Bose® link output of your Lifestyle® system media center brings fresh musical possibilities to another room, including outdoors. Just add your choice of Bose stereo speakers. (Note: Lifestyle® SA-3 amplifier recommended for more powerful Bose speakers.) You can listen to what's playing in the main room...a CD, for example, or something different – perhaps your favorite FM station. Both at the same time, from one Lifestyle® system. So, the kids and their friends can keep on watching their movie while you enjoy some quality time – and quality Bose sound – out on the patio. And you can control your music from wherever you are with the dedicated radio frequency remote control. Bose patented signal processing circuitry automatically adjusts tonal balance for practically any volume level. The SA-2 amplifier is small enough to be easily hidden on the floor or on a shelf. You can even mount it to a wall or a floor joist. Get more out of your Lifestyle® system through Bose® link...and the SA-2 Lifestyle® stereo amplifier.

CATALOGUE COPY BLOCK

Bose® Lifestyle® SA-2 Stereo Amplifier

The most popular stereo amplifier from Bose works with your Lifestyle® system – and Bose® link – to bring music to a second room of your home, even outdoors. Simply connect the amplifier to the Bose® link output of your Lifestyle® media center with the included Bose® link cable, then connect your choice of Bose speakers to the amplifier. With the optional Lifestyle® expansion remote control you can choose the same musical program playing in the main room (a CD, for example) or something different (FM stereo). Compatible with Bose speakers rated 6 ohms or higher. Two-channel stereo operation, 40 watts (minimum) per channel. Size: 3½"H x 14¼"W x 5½"D. Color: Black.

SIMPLIFIED BULLETED FORMAT

Our most popular Lifestyle® system expansion stereo amplifier.

- Works with your Lifestyle® system and Bose® link to bring high-quality sound to other rooms in your home.
- Full, rich stereo sound, even at low volumes, from Bose® patented signal processing circuitry.
- Enables on-location choice between two independent audio streams from a Bose® link-enabled Lifestyle® system, with a Lifestyle® expansion remote control.
- Easy to hook up, easy to conceal.
- Room selector switches can assign multiple SA-2 amplifiers to specific rooms and specific Lifestyle® radio frequency remote controls.

For all copy on this page: CD-ROM folder: *copy blocks*
 CD-ROM file: *promocopy.pdf*

BOSE_SUB-0000452

BOSE_SUB-0000452.

679. Indeed, as shown below, Bose LifeStyle allows for a user to control a single room

Contains Highly Confidential AEO and Source Code Materials

or two or more rooms that share a source (Room button), or to control all connected rooms as one (House button). Based on the room indicators, a boxed letter indicates the presently -selected room or rooms, and only these rooms will be affected by any sources changes. In my opinion, the implication is that when additional zones are added to the Bose LifeStyle media center, those additional zones will remain offline, until prompted by the user. At that time, as further described below, the Bose Link communication protocol is used to communicate with the newly added zone to bring it “online.”

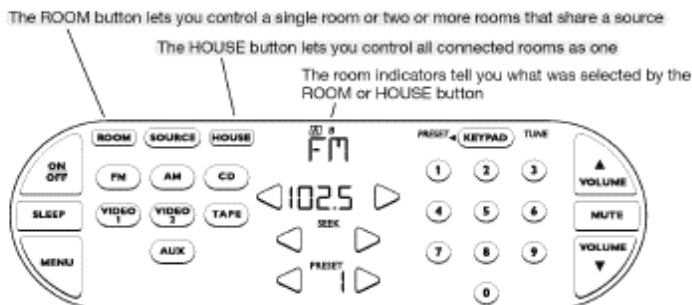
Contains Highly Confidential AEO and Source Code Materials

Operating a Multi-Room Lifestyle® 50 System**Operating in more than one room**

Your Lifestyle® 50 system can control up to four sets of Bose® powered speakers, allowing your family to enjoy different audio sources (CD, radio, TV, etc.) in up to four rooms. These rooms are referred to as room A, B, C, and D, with room A being the primary room (the one used for a one-room system). If two or more rooms are connected to your system, the Personal™ music center displays ROOM and HOUSE buttons, and room indicators (A, B, C, and/or D). Figure 48 shows an example display for a two-room system.

Figure 48

Example display for a two-room system

**Understanding the room indicators**


- ☒ A boxed letter indicates the presently-selected room or rooms. The selected room is affected by any source changes, or any change you make using the VOLUME, MUTE, ON/OFF, or SLEEP buttons.
- ☐ An unboxed letter indicates a room listening to a **shared source**. A shared source is one that is playing in the controlled room as well as in up to three additional rooms. If you change the radio station, CD track, etc., of the shared source, the change affects all rooms sharing this source. However, you cannot change sources for all affected rooms at the same time. The VOLUME, MUTE, ON/OFF, and SLEEP buttons only affect the boxed room(s).
- ☐ An empty box appears for each connected room when you press the HOUSE button. When you change the volume in the HOUSE mode, the numerical level appearing on the display does not represent the actual volume level in all connected rooms. It only represents the actual volume in rooms represented by a boxed letter.

Contains Highly Confidential AEO and Source Code Materials

Operating a Multi-Room Lifestyle® 50 System


Using the HOUSE button

Using the HOUSE button, you can link all rooms together and control them as one. When you press the HOUSE button, an empty box indicator is displayed for each connected room. Any button pressed after that (any source button, VOLUME, MUTE, or SLEEP) affects every room. When you are done listening you can press OFF to turn off the entire system.

 **Note:** If you do not press any additional buttons after pressing HOUSE, pressing HOUSE again cancels HOUSE mode.

Press the HOUSE button before each command to apply that command to all rooms:

Press ...	To do this ...
HOUSE then a source	Play the selected source in all connected rooms.
HOUSE then VOLUME ▲▼	Adjust the volume up or down by the same amount in all rooms that are on, or all connected rooms if they are all off. The system remembers the differences among the original room volume settings.
HOUSE then MUTE	Silence all connected rooms that are on, even if any were previously muted individually. To cancel this command, press HOUSE then MUTE again. Any rooms that were muted before this command was given stay silent until individually unmuted. If you unmute an individual room after it was muted by a HOUSE - MUTE command, the other rooms remain silent until each one is unmuted individually. Pressing HOUSE then VOLUME ▲ unmutes all muted rooms.
HOUSE then SLEEP	Set the SLEEP timer for all rooms that are on. The SLEEP time selected applies to all rooms that are on even if they are playing different sources. If the SLEEP timer was already set in one or more rooms, the display shows the longest time already set. You can accept this time or change it for all the rooms. To cancel the HOUSE - SLEEP command, press HOUSE, SLEEP, CLEAR, and then DONE.
HOUSE then OFF	Turn off the entire system.

 **Note:** Instead of setting the whole house to one sleep time, you can set different sleep times for individual rooms by using the ROOM button to select each room and setting SLEEP. When two or more rooms are linked, adjusting the SLEEP time affects all linked rooms (indicated by boxed letters).

Using more than one Personal™ music center

If you have a multi-room system, you can add additional music centers for some or all of the connected rooms. Each multi-room interface can be controlled by a maximum of four music centers. Each music center can control up to four rooms.

To add a new music center to your system, follow the setup instructions on page 17. Be sure to install the batteries and turn it on for the first time close to the multi-room interface to allow the new music center to set up a radio frequency link with your system. If the multi-room interface is not plugged in or the music center is out of range, the display indicates NO RESPONSE.

BOSE_SUB-00000045.

680.

1) Obviousness - POSITA

681. In the alternative, it would have been obvious to a person of skill in the art to allow

Contains Highly Confidential AEO and Source Code Materials

the Zone Players to remain in standalone mode as claimed. Indeed, the Sonos inventor wrote that there were only three possibilities for the behavior when a speaker is added to a group, as shown below in an excerpt from the provisional appendices in numbers 1-3.

1.1.3 What happens to the Music that's already playing when a Zone Scene is started.

If no music is playing in any Zone – then the zones will simply link in a group.

If music is playing in one or more zones there are several possibilities (TBD)

1. The Music Queue in the zone group that was formed by the Zone Scene will be empty. In other words – the music will stop in any room that is part of the Zone Scene. This is the simplest solution, but may lead to frustration.
2. The user gets to choose from which of the 'joining' Queues the new zone group should play. This could be in the form of a dialog:

What should the new Zone Group play?

No Music

Track 1

Track 2

Radio Station A

Note that this method would only be useful (and possible) with simple Zone Scene grouping. With Advanced Zone Scene groupings, this dialog would become much too complicated.

3. In the case where only one of the zones in the new group was playing music, the new group should take the music (and Queue) of that zone.

SONOS-SVG2—00167534 at 167537.

682. However, there are actually four possibilities for actions when a speaker is added to a group, not three, because none of the above are actually claimed, as I describe in Section XI. A person of skill in the art would have found it obvious to choose from one of these possibilities—stop music, choose music, adopt the music of the only playing speaker, and continue playing the “standalone” music—when adding a speaker to a group. These are a limited number of obvious design options.

- 1) Obviousness - Millington

Contains Highly Confidential AEO and Source Code Materials

683. Further, a person of skill in the art would have been motivated to combine Bose LifeStyle with Millington. They are both in the same field of endeavor—control of speaker systems, speaker groups, synchronous playback of speakers, and home audio systems—and they both describe the same features and devices (e.g., “zone players”) in the same language. Further, a person of skill in the art looking to Bose LifeStyle would have also reviewed materials authored by one of the engineers, like Mr. Millington, that was working on the Sonos System to learn more about its capabilities given that Bose LifeStyle and Sonos were competitors.

Contains Highly Confidential AEO and Source Code Materials



February 07, 2005 | PLAYLIST

Review: Sonos Digital Music System

Innovative system's similarities to the iPod are more than skin deep.

By Dan Frakes

It used to be that listening to music at home happened mainly in one place—the room where all your CDs or, for us old-timers, LPs and cassettes were stored. A few houses had cheezy intercom-based speakers spread throughout the house, but these ugly wall consoles generally sat there, unused, a remnant of 1970s experiments in “cutting edge” technology. Upper-income-bracket audio geeks were able to install better whole-house audio systems, but these were rare.

That was then. Over the past few years, two technological trends have taken hold that promise to significantly change the face of home music listening. The first is the popularity of digital music. And by that I don’t mean CDs, but rather the storage and playback of music data files: MP3s, AACs, AIFFs, WAVs, etc. More and more people are storing their entire music collection on computers, iPods, and other high-capacity media.

The second trend is the increasing pervasiveness of wireless data networks in the home. Nowadays, most people either have a wireless home network or know someone who does. It’s safe to say that in the not-too-distant future, wireless home networks will be as common as wired telephones.

I bring up these two trends because of their inevitable convergence. It’s only a matter of time before your average consumer realizes that if they have all their music stored in a format that can be sent over a wireless network, they should be able to listen to *any* of their music *anywhere* in their home at *any* time.

Several companies have attempted to bring this convergence to the masses, including Apple via its AirPort Express with iTunes, Slim Devices with its Squeezebox, and Roku with its SoundBridge units. But each of these systems has significant flaws—an AirPort Express system can only play to a single room and has no screen; the Roku units can’t sync across multiple rooms; and the Squeezebox, which probably does the most right, still doesn’t make it easy to navigate large music collections. The market is ripe for a product that does the whole-house-music thing right.

IA at 202.

Contains Highly Confidential AEO and Source Code Materials

How much is it gonna cost me?

Alas, all this technology isn't cheap. ZonePlayers retail for \$499 each, with Controllers at \$399 each; a "starter" set of two ZonePlayers and a single Controller is \$1199. Although these prices may seem high to many consumers, it's important to keep in mind that each ZonePlayer is, as mentioned above, an integrated amplifier, wireless base station, and digital-to-analog converter in one small unit; \$499 doesn't seem so steep when you consider how much it would cost to buy similar components separately. It's also helpful to put the Digital Music System in context—it's designed to replace multi-room, built-in audio systems that often cost upwards of \$10,000 for multiple rooms. For a budget of \$2600 plus speakers, you can provide custom audio to four rooms with two Controllers.

Another way to look at the value of the Digital Music System is to consider what you would need to purchase to get similar functionality using other products. For example, you could purchase several of Apple's AirPort Express units at \$129 each to deliver audio to different rooms. But you'd also need to purchase stereo systems for each room, you couldn't listen to music in more than one room at once, and you wouldn't be able to view and control the music being played without purchasing a laptop. Slim Devices' Squeezebox units provide a small screen and remote control, as well as a "synchronized play" option, but you're still talking \$280 for each Squeezebox, plus you'd again need to buy a stereo for each room at a few hundred bucks (at least) a pop. That's about the same price as the Sonos with many of the other limitations of the AirPort Express system.

IA at 205.



My test setup included a ZP80 along with a pair of ZP100's (pictured at left), a C100, and a pair Sonos Speakers. I have also hooked up a pair of Carver HT5.1 bookshelf speakers to one ZP100 and an Altec Lansing self-powered satellite-subwoofer PC speaker system to the ZP80.

Pricing: It Depends On Your Point Of View

What's unique about the Sonos' pricing is that it is either extremely expensive or a significant bargain, depending on your point of view. The Sonos ZonePlayers are \$499 each for the ZP100 (the one with a built-in amplifier) and \$349 for a ZP80 (the one without the amplifier). ZoneControllers cost \$399 each, speakers are \$179, charging docks for the ZoneController are \$49, and a spare charger cables is another \$19. The least expensive bundle is \$999, which will be fine for many users, but expects users to both BYOS and BYOA.

This pricing makes technical early adopters scratch their heads and whine that compared to most streaming audio players, the Sonos is wildly overpriced. The Omnifi Simplefi I've had in the house for a couple of years, along with products from Pinnacle, Roku, Squeezebox, Linksys, and Apple, all cost between \$129 and \$299. Other options are mating an iPod with an Apple, Klipsch, or Bose audio dock: presto! music wherever you are. Finally, a cheapskate friend pointed out that boomboxes cost \$39 at Target and can also put music in your room. If you'd be happy with a boombox - or even an iPod and an Apple HiFi - then the Sonos is clearly too expensive.

At the other extreme, a custom installed system can cost tens of thousands of dollars for a multi-zone setup that would cost \$3,000 or \$4,000 with a Sonos. In this respect, the Sonos is an incredible bargain.

The problem with the iPod and boombox is that they are single zone solutions - when you leave that room, you leave your music (and the boombox will only be able to play a fraction of your music collection, digitized or not). True, you could put a speaker dock in every room of your house and move the iPod with you, and if you live alone, this is a perfectly valid solution, but even then you need to move the iPod every time you leave the room, and it's hardly sufficient for a party.

The problem with most streaming media players is that they are either single zone (Apple, Linksys), cannot selectively synchronize music among multiple zones (all but the Squeezebox), have no display for selecting music to play (Apple, Linksys), have only a basic user interface (all), require a reasonable level of comfort with technology for setup (all except the Apple), and cannot accept music from remote sources and stream that around (all).

Contains Highly Confidential AEO and Source Code Materials

IA at 227.

684. Millington discloses “synchrony groups,” which correspond to the synchronization groups disclosed in Bose LifeStyle. Millington notes that “[a] user, using the user interface module 13, can enable a zone player 1 l(n) that is currently not a member of a synchrony group to join a synchrony group, *after which it will be enabled to play the audio program that is currently being played by that synchrony group.*” Millington, 7(emphasis added); *see also id.* at 9 (“Contemporaneously, the zone player 1 l(n) can notify the master device of the synchrony group that it (that is, zone player 1 l(n)) is joining, after which the master device can begin transmission of audio information and timing information to that zone player 1 l(n). The zone player 1 l(n) can thereafter begin playback of the audio program defined by the audio information, in accordance with the timing information so that the zone player 1 l(n) will play the audio program in synchrony with the master device.”); *id.* at 41 (“The system is such that synchrony groups are created and destroyed dynamically, and in such a manner as to avoid requiring a dedicated device as the master device.”). Accordingly, Millington discloses that even when a zone player is added to a zone group (i.e., synchrony group), that it is only *enabled* to play the audio program playing in the synchrony group, but it does not necessarily play that audio immediately. Instead, the zone player must later transition to synchronous playback, as the claims require.

685. Further, as discussed above, a person of skill in the art would have been motivated to combine the Sonos System with Millington. They are both in the same field of endeavor—control of speaker systems, speaker groups, synchronous playback of speakers, and home audio systems—and they both describe the same features and devices (e.g., “zone players”) in the same language. Further, a person of skill in the art looking to the Sonos System would have also reviewed materials authored by one of the engineers, like Mr. Millington, that was working on the

Contains Highly Confidential AEO and Source Code Materials

Sonos System to learn more about its capabilities.

686. Millington discloses “synchrony groups,” which correspond to the zone groups disclosed in the Sonos System. Millington notes that “[a] user, using the user interface module 13, can enable a zone player 1 l(n) that is currently not a member of a synchrony group to join a synchrony group, *after which it will be enabled to play the audio program that is currently being played by that synchrony group.*” 7 (emphasis added); *see also id.* at 9 (“Contemporaneously, the zone player 1 l(n) can notify the master device of the synchrony group that it (that is, zone player 1 l(n)) is joining, after which the master device can begin transmission of audio information and timing information to that zone player 1 l(n). The zone player 1 l(n) can thereafter begin playback of the audio program defined by the audio information, in accordance with the timing information so that the zone player 1 l(n) will play the audio program in synchrony with the master device.”); *id.* at 41 (“The system is such that synchrony groups are created and destroyed dynamically, and in such a manner as to avoid requiring a dedicated device as the master device.”). Accordingly, Millington discloses that even when a zone player is added to a zone group (i.e., synchrony group), that it is only *enabled* to play the audio program playing in the synchrony group, but it does not necessarily play that audio immediately. Instead, the zone player must later transition to synchronous playback, as the claims require.

687. Millington further discloses keeping a media player in standalone mode after joining a group, because players disclosed by Millington continue to operate independently of the newly joined group. — (“As another possibility, the user may enable the zone player 1 l(1) to leave the synchrony group with zone player 1 l(2) and join the synchrony group with zone player 1 l(6). In connection with the last possibility, the zone player 1 l(1) can continue providing audio information from the audio information source 14(1)(1) to the zone player 1 l(2) for playback thereby.”).

Contains Highly Confidential AEO and Source Code Materials

688. Millington discloses that speakers may be enabled to play back music in a group when they join that group, but do not necessarily do so. ___ (“A user, using the user interface module 13, can enable a zone player 11(n) that is currently not a member of a synchrony group to join a synchrony group, after which it will be enabled to play the audio program that is currently being played by that synchrony group.”).

1) Obviousness - Rajapakse

689. It would have been obvious to combine Rajapakse with Bose LifeStyle for the reasons discussed above. As discussed below, Rajapakse discloses this claim element.

690. Rajapakse discloses keeping speakers in a standalone mode. Rajapakse, 14:37-40 (“Also it is possible to have the media renderers in no specific zone, which can be considered as equivalent to the media renderers being in zone 0 or a default zone.”).

691. Rajapakse discloses that after being added to a zone, the media renderer (speaker) may be playing or idle, so it may not be invoked by any zone (i.e., in standalone mode). Rajapakse, 7:52-56 (“The identity information includes the media renderer's identifier, its set of assigned zone identifiers (ZIDs), and its role within each zone, and known default stream identifiers for each zone. The current state information includes its current playing state: playing or idle.”). Sonos described “standalone mode” this way in its summary judgment brief, as discussed above.

692. Rajapakse discloses dynamic grouping and transitioning speakers among groups. Rajapakse, 3:65-4:2 (“If the user and media source 101 move to the dining room that also has a set of destination devices 103 present, it is desirable for music playback from the media source 101 to transition to this new set of destination devices 103 automatically and without interruption.”).

693. Rajapakse also discloses that the user may select which zone to invoke from many different zones. Rajapakse, 8:34-40 (“After zone manager discovery 602, the zone control point 209 retrieves zone information from each zone manager 210 and the zone control point 209 then

Contains Highly Confidential AEO and Source Code Materials

uses this information to select a zone from the available set of zones. This selection may be an auto selection from the available zones (ZIDs) based on some preset criteria, such as signal strength, or based on user selection. . . . This process allows the user and zone control point 209 to get information on the zone, view media available to play on the zone and then make a selection.”).

694. Rajapakse discloses transitioning from one zone to another or transitioning from not playing music to playing music. Rajapakse, 8:67-9:2 (“If a new zone control point 209 requests the zone, the previous zone control point 209 can release the reservation.”).

695. Rajapakse discloses transitioning from one zone manager to another. Rajapakse, 9:35-44 (“If a media renderer 203 is already registered with another zone manager when the registration request comes in, and the registration request passes authentication, before responding, the media renderer 203 will notify 707 its current zone manager of the registration request from the new zone manager and ask for permission to deregister. If the current zone manager does not respond to this deregistration request within a timeout period, the media renderer 203 will assume approval and accept the new registration request from the new zone manager.”).

696. Rajapakse discloses forcing a transition of a media renderer from one zone to another. Rajapakse, 9:57-59 (“The user may, via the zone control point 209, cause the zone manager 210 to send a force registration 703 request to a media renderer.”).

(x) *Limitation 1.9: “after the given one of the first and second zone scenes has been selected for invocation, receiving, from the network device over the data network, an instruction to operate in accordance with a given one of the first and second zone scenes respectively comprising a given one of the first and second predefined groupings of zone players; and”*

697. In my opinion, Bose Lifestyle discloses this claim limitation.

Contains Highly Confidential AEO and Source Code Materials

698. As described in the previous claim elements, and shown briefly below, a user may select a synchronization group for playback using the Room button, and use the playback controls to cause Bose LifeStyle to operate as a synchronous playback group.

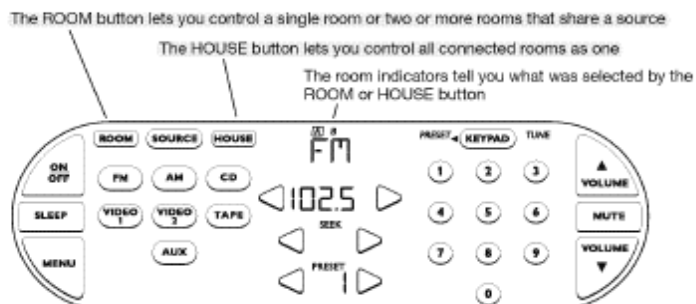
Operating a Multi-Room Lifestyle® 50 System

Operating in more than one room

Your Lifestyle® 50 system can control up to four sets of Bose® powered speakers, allowing your family to enjoy different audio sources (CD, radio, TV, etc.) in up to four rooms. These rooms are referred to as room A, B, C, and D, with room A being the primary room (the one used for a one-room system). If two or more rooms are connected to your system, the Personal™ music center displays ROOM and HOUSE buttons, and room indicators (A, B, C, and/or D). Figure 48 shows an example display for a two-room system.

Figure 48

Example display for a two-room system




Understanding the room indicators


- ☒ A boxed letter indicates the presently-selected room or rooms. The selected room is affected by any source changes, or any change you make using the VOLUME, MUTE, ON/OFF, or SLEEP buttons.
- ☐ An unboxed letter indicates a room listening to a **shared source**. A shared source is one that is playing in the controlled room as well as in up to three additional rooms. If you change the radio station, CD track, etc., of the shared source, the change affects all rooms sharing this source. However, you cannot change sources for all affected rooms at the same time. The VOLUME, MUTE, ON/OFF, and SLEEP buttons only affect the boxed room(s).
- ☐ An empty box appears for each connected room when you press the HOUSE button. When you change the volume in the HOUSE mode, the numerical level appearing on the display does not represent the actual volume level in all connected rooms. It only represents the actual volume in rooms represented by a boxed letter.

Contains Highly Confidential AEO and Source Code Materials

699. Further, Bose Link is used as protocol to communicate between and amongst the various zones in order to invoke, for example, the play command that simultaneously plays audio in multiple zones. More specifically, Bose Link in conjunction with the media center operates over a network and allows for a user's pre-defined zones to also play different audio in simultaneously.



PTSC
PROTECTOR TECHNOLOGICAL SYSTEMS CORPORATION
Company Confidential




What is Bose Link?

Bose link is a communication protocol. To communicate there must be at least two participants that speak the same language. To Bose products, Bose link is that language.

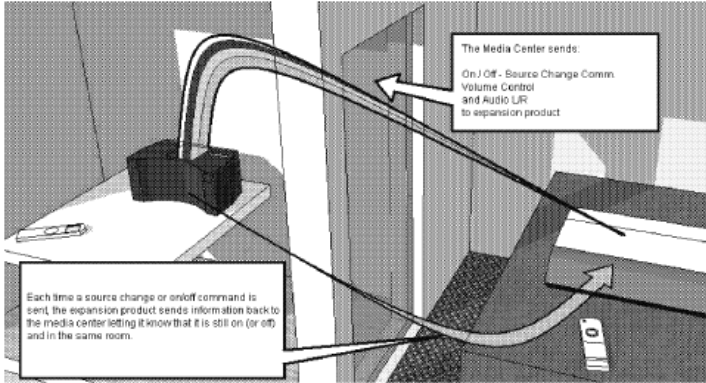
Rooms

There are 15 different rooms that can be controlled by a Bose link enabled media center. The main room – labeled room A – is reserved for the Lifestyle speaker components. The other rooms – rooms B-O – are reserved for expansion via Bose link.



For a Bose link setup to work the system must include a Bose link enabled media center (a controller), a Bose link expansion product, and an expansion remote control. Both the expansion product and the remote must be configured to operate on the same room.

A Bose link connection is essentially a conversation between the media center and the expansion device. The media center sends on/off, volume and source change commands along with audio to the expansion product. The expansion product responds by sending information back to the media center to let it know that it is still on (or off) and in the same room. This information exchange occurs each time a power or source change command is issued by the expansion remote.



When the media center receives an ON command from an expansion remote the system turns on and checks for any Bose link products that might be connected, but it will only look for Bose link products that are assigned to the same room as the remote.

Understanding Bose® link

Page 2 of 8

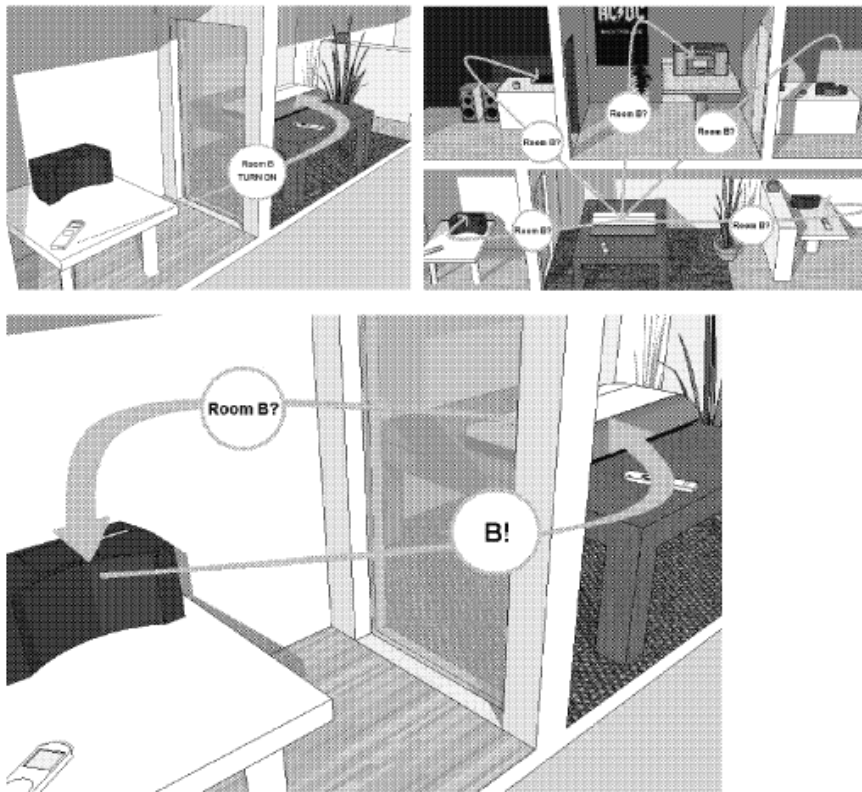
Contains Highly Confidential AEO and Source Code Materials



Company Confidential



If the media center receives a command from a remote configured for room B, for example, the media center calls out to other Bose link products which might be assigned to room B. If a connected expansion product is assigned to room B it will respond to the media center and a Bose link connection will be made. The media center will not acknowledge a response from anything not assigned to room B.



The media center will not acknowledge more than one response from the same room, either. As with any productive conversation, there can only be one person speaking at a time. If more than one product is assigned to room B the media center won't know which one to listen to. If the media center can't understand the response from the expansion products, or if there is no response at all, the media center will turn itself off and the Bose link connection will not be successful.

Understanding Bose® link

Page 3 of 8

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

BOSE_SUB-0000596

BOSE_SUB-0000596.

Contains Highly Confidential AEO and Source Code Materials



Company Confidential



Streams

A Bose link enabled media center is also capable of managing two separate sources at the same time. Each source can be sent to one of two different outputs - or 'streams' - within the Bose link connection. 4 of the 9 pins that make up the Bose link connection on the back of the media are responsible for delivering these streams - all of which are analog. Two pins are reserved for stream 1 audio L/R (fixed), and another two pins carry stream 2 audio L/R (fixed) - (there is another pair of pins that carry variable stream 2 audio that will be discussed later). Every Bose link expansion product has 2 inputs to accommodate each stream, and the remote control tells the device which stream to listen to. The expansion products receive fixed audio and then control volume via commands they receive from the media center carried on other pins.

Here is an example:

If an expansion remote configured for stream 1 sends an ON command to the media center, the media center will activate the pins that carry stream 1 information. The media center will also call out to any Bose link product set to the same room code as the remote. If the media center gets an answer it can understand, it will respond by telling the expansion product to turn on and listen to its stream 1 inputs. If the media center does not get a response from an expansion product set to the same room as the remote it will simply turn itself off.

The main room, or room A, can only operate on stream 1. Although any of the expansion rooms can be configured to operate on either stream 1 or stream 2, expansion rooms are generally assigned to stream 2. Since only one source can be sent to each stream at any given time, keeping Bose link expansion products on stream 2 prevents changes made in expansion rooms from affecting what is being played in the main room, and vice-versa.

Contains Highly Confidential AEO and Source Code Materials

(xi) *Limitation 1.10: “based on the instruction, transitioning from operating in the standalone mode to operating in accordance with the given one of the first and second predefined groupings of zone players such that the first zone player is configured to coordinate with at least one other zone player in the given one of the first and second predefined groupings of zone players over a data network in order to output media in synchrony with output of media by the at least one other zone player in the given one of the first and second predefined groupings of zone players.”*

700. In my opinion, Bose LifeStyle discloses this claim limitation.

701. As described in the previous claim elements, a user may select a synchronization group for playback using the Player selector box, and use the playback controls to cause Bose LifeStyle to operate as a synchronous playback group.

XI. INVALIDITY BASED ON SECTION 112

702. In my opinion, the specification of the '885 patent fails to convey with reasonable clarity to those skilled in the art that, as of the filing date, the named inventor was in possession of the invention. Sonos filed the application that led to the '885 Patent on April 12, 2019, but that patent application claims priority through a long chain of continuation applications back to a provisional application filed on September 12, 2006. In the intervening 13 years of patent prosecution, Sonos added new matter during the claim amendment process that was not originally disclosed.

703. In the original application, the claims related to configuring the zone scene. In the 2019 patent application, the claims cover an intricate set of instructions for putting particular “zone players” into particular “scenes” in a particular order. Claim 1 is set out below:

Contains Highly Confidential AEO and Source Code Materials

1. A first zone player comprising:

a network interface that is configured to communicatively couple the first zone player to at least one data network;

one or more processors;

a non-transitory computer-readable medium; and

program instructions stored on the non-transitory computer-readable medium that, when executed by the one or more processors, cause the first zone player to perform functions comprising:

while operating in a standalone mode in which the first zone player is configured to play back media individually in a networked media playback system comprising the first zone player and at least two other zone players:

(i) receiving, from a network device over a data network, a first indication that the first zone player has been added to a first zone scene comprising a first predefined grouping of zone players including at least the first zone player and a second zone player that are to be configured for synchronous playback of media when the first zone scene is invoked; and

(ii) receiving, from the network device over the data network, a second indication that the first zone player has been added to a second zone scene comprising a second predefined grouping of zone players including at least the first zone player and a third zone player that are to be configured for synchronous playback of media when the second zone scene is invoked, wherein the second zone player is different than the third zone player;

after receiving the first and second indications, continuing to operate in the standalone mode until a given one of the first and second zone scenes has been selected for invocation;

after the given one of the first and second zone scenes has been selected for invocation, receiving, from the network device over the data network, an instruction to operate in accordance with a given one of the first and second zone scenes respectively comprising a given one of the first and second predefined groupings of zone players; and

based on the instruction, transitioning from operating in the standalone mode to operating in accordance with the given one of the first and second predefined groupings of zone players such that the first zone player is configured to coordinate with at least one other zone player in the given one of the first and second predefined groupings of zone players over a data network in order to output media in synchrony with output of media by the at least one other zone player in the given one of the first and second predefined groupings of zone players.

Contains Highly Confidential AEO and Source Code Materials

704. Generally, the claim requires a first zone player to operate in “standalone mode” and play back media “individually.” Then the first zone player is added to a zone scene including the first zone player and a second zone player. Then the first zone player is added to another zone scene, including the first zone player and a third zone player. Adding the first zone player to the two scenes does not change the first zone player from continuing to play back media individually until one of the zone scenes is “invoked,” which causes the first zone player to “transition” from individually playing back media to playing back media as part of the invoked zone scene.

705. The specification never discloses this specific set of operations. Instead, the specification discloses a home audio system including “zone configurations,” speaker groups, and “zone scenes.” It does not describe how those limitations are combined, what happens when they are combined as set forth in the claim, or even whether zone scenes can include a shared zone player. A person of skill in the art reading the patent specification would not understand the patent to disclose this particular claimed set of operations.

706. First, the specification does not provide support for the claim limitation “a second indication that the first zone player has been added to a second zone scene comprising a second predefined grouping of zone players” because the specification never discloses that a zone player may be added to two zone scenes at the same time. The claims require that the first zone player is added to both a first and a second zone scene, but there is no description, or even an illustration, of adding a first zone player to two different scenes of zone players. Indeed, in the figures showing which zones can be added to a “zone configuration” or “scene,” there is no disclosure of adding the same zone (e.g., bathroom) to multiple zone configurations or scenes. As shown below, in Figure 3A (from the original ’206 Patent), the “zone configuration / scene” includes the bedroom, den, and dining room. The bedroom, den, and dining room are not included in any other zone

Contains Highly Confidential AEO and Source Code Materials

configurations or scenes.

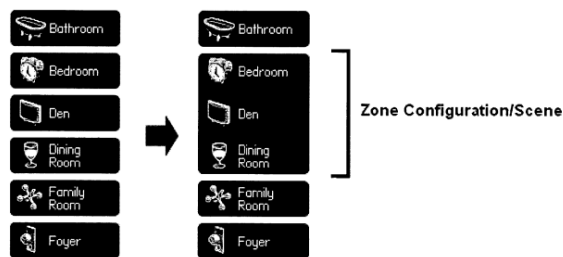


FIG. 3A

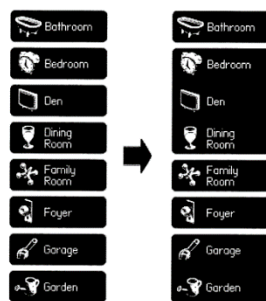


FIG. 3B

707. There are no embodiments disclosed in the specification showing a zone player included in more than one scene or even more than one group. While the figures above show including particular zones in a scene, there is only a single scene and as a result no overlap of zone players within multiple scenes. Nor would a person of ordinary skill in the art have understood the specification to contain an equivalent description.

708. The closest the specification comes to disclosing scenes with overlapping zone players is the following portion of the specification:

In order to satisfy such requirements, two groups of audio players must be established. In the morning, the audio players in the bedroom, the bathroom and the den need to be grouped for the broadcast news. In the evening, the audio players in the den and the living room are grouped for the music. Over the weekend, the audio players in the den, the living room, and a kitchen are grouped for party music. Because the morning group, the evening group and the weekend group contain the den, it can be difficult for the traditional system to accommodate the requirement of dynamically managing the ad hoc creation and deletion of groups. '885 Pat. at 2:5-12.

709. But this disclosure actually teaches away from having scenes existing at the same

Contains Highly Confidential AEO and Source Code Materials

time with overlapping zone players. Rather, the specification teaches that the three groups exist at different times—one in the morning, one in the evening, and one over the weekend. The specification offers the solution that “[w]ith a minimum manipulation, the audio players may be readily grouped,” but this does not disclose that speakers may belong to more than one group at any given time, and neither does the specification’s generic recital that “there is a need to individually or systematically adjust the audio volume of the audio players.” *Id.* at 2:18-20.

710. Second, the specification does not provide support for the claim limitations “continuing to operate in the standalone mode until a given one of the first and second zone scenes has been selected for invocation” and “transitioning from operating in the standalone mode to operating in accordance with the given one of the first and second predefined groupings of zone players.” The specification provides no description or figures describing what happens when a speaker in “standalone mode” (a term never used in the specification) is added to multiple zone scenes and then one of those zone scenes is later invoked. Because the inventors did not contemplate having speakers in overlapping zone scenes, the specification does not disclose what might happen when a speaker playing back music individually is added to a zone scene. For example, the specification could have disclosed that the speaker begins playing back whatever music the zone scene requires when added to that scene, or it could have recited that the speaker discontinue playing any music when it is added to the zone scene, or it could have recited asking the user for guidance as to continue playing music or transitioning to whatever music is playing in the zone scene. Instead, the specification is completely barren on this issue. The closest disclosure in the specification is the following:

upon the activation of a saved scene, the process 600 checks the status of the players associated with the scene. The status of the players means that each of the players shall be in condition to react in a synchronized manner. ’885 Pat. at 10:56-58.

711. But this portion of the specification only discloses that upon “activation” of a scene,

Contains Highly Confidential AEO and Source Code Materials

the players are in condition to react in a synchronized manner. It does not describe the behavior of players when added to multiple scenes, and in particular it does not describe that players in “standalone” mode (which is never mentioned in the specification) continue as if they had not been added to any zone scene at all.

712. To the extent Sonos seeks to rely on the provisional application (SONOS-SVG2-00033730) for written description support, that too is insufficient. Although an “appendix” to the provisional application includes a section titled “What happens to the Music that’s already playing when a Zone Scene is started,” that section does *not* disclose the claimed method. SONOS-SVG2-00167534 at 537. Rather, the provisional appendix teaches that “if music is playing in one or more zones there are several possibilities (TBD),” showing that this was an issue the inventors considered but was still “to be determined” at the time of filing the application. *Id.* The three options discussed in that section for how to handle what happens to a player that is already playing music when a zone scene is started are different from what Sonos claimed some 16 years later when the ’885 patent was modified during prosecution.

713. The first option given in the provisional appendix is that “the music will stop in any room that is part of the Zone Scene.” *Id.* This is irrelevant because Sonos did not claim this option. The second option is that the “user gets to choose from which of the ;joining’ [sic] Queues the new zone group should play.” *Id.* Sonos did not claim this option either; in the claims, the user is not given any option as to what the zone scene should play. The third option given in the provisional appendix is that “[i]n the case where only one of the zones in the new group was playing music, the new group should take the music (and Queue) of that zone.” *Id.* That too is different from what is claimed in the ’885 Patent. The claims describe a situation where the newly-added zone player will continue playing music in standalone mode until it is overridden by an “invocation” of the zone scene. The claims do not cover the situation where only one of the zone players is playing

Contains Highly Confidential AEO and Source Code Materials

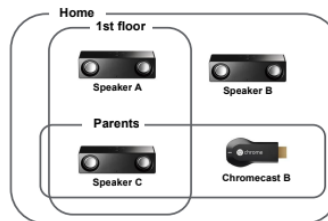
media and upon invocation of the zone scene all players start playing that same media.

714. The specification and provisional appendix at best disclose generic speaker grouping or how to handle particular (unclaimed) situations upon invoking a zone scene. The specification does not disclose the same solution that is claimed, and I understand that merely rendering the claimed solution obvious is insufficient.

715. I understand that in June 2014, Google engineers made a confidential presentation to Sonos that revealed their work supporting overlapping speaker groups. As shown in this presentation below, under Google's proposal, speakers A, B, C, and Chromecast B could all be in a "Home" group, speakers A and C could be in a "1st Floor" group, and speaker C and Chromecast B could be in a "Parents" group. This is the overlapping player functionality that Sonos later claimed without disclosing in its 2006 patent application:

Multi Zone Groups - C4A Device<->Group relationship

- Each C4A device can be a member of several groups
- Chromecasts shall be supported as group members
- Up to ~10 devices speakers in a single group



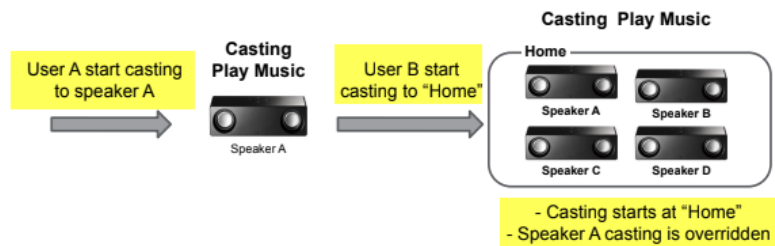
GOOG-SONOSNDCA-00056732 at 756.

716. I understand that Google revealed to Sonos during that same confidential meeting that "casting" to a speaker group where that speaker was already playing music individually would "override" the prior command to the speaker:

Contains Highly Confidential AEO and Source Code Materials

Multi Zone Groups - Overriding previous cast

- For every speaker the last request overrides previous casting



Id. at 761 (highlighted).

717. In Google’s illustration, a user begins casting to speaker A, then a second user begins casting to a Home group that includes speaker A. *Id.* The result is that the prior cast to speaker A is “overridden.” *Id.* Sonos appears to have attempted to mimic Google’s proposal in its claims with its addition of “transitioning” the “standalone” first zone player to one of the zone scenes. I understand that Sonos cites to this very same presentation to allege that Google infringes Sonos’s patent. Dkt. 251 at 17-18 (Sonos Op. MSJ Br.). I reserve my rights to address any infringement opinions that Sonos’s experts may provide, and in my opinion there is not infringement of Claim 1 of the ’885 patent for other reasons despite the similarities identified above.

718. Sonos responded in Reply to the evidence set forth above, and briefing from Google which I agree with and have adopted in part. Below I set forth Sonos’s arguments (Dkt. 274 at 10-12) and my responses to those arguments.

719. Sonos makes five arguments that overlapping speaker groups were disclosed in the original ’885 patent specification:

First, the ’885 Patent discloses that after one “zone scene” has been set up (i.e., created and saved), a user may “go back . . . to configure another [zone] scene if desired” – which conveys to a POSITA that any number of different “zone scenes”

Contains Highly Confidential AEO and Source Code Materials

can be set up for a given system and exist at the same time. See '885 Pat., FIG. 6, 10:51-52; Ex. R, ¶45.

Second, the '885 Patent discloses examples where multiple different “zone scenes” have been set up and are in existence at the same time. See, e.g., '885 Pat., FIG. 8 (disclosing “Wakeup” and “Garden Party” scenes that are in existence at the same time); see also id., 8:52-9:19 (disclosing four different examples of “zone scenes” for a given system); Ex. R, ¶46.

Third, the '885 Patent discloses that when a user is selecting which “zone players to add during setup of each “zone scene,” the user is presented with “ALL the zones in the system, including the zones that are already grouped” – which conveys to a POSITA that each “zone scene” being set up can include any grouping of “zone players” in a multi-zone audio system, regardless of whether the “zone players” are included in any other “zone scenes” and thus that multiple “zone scenes” with one or more overlapping “zone players” can be set up and exist at the same time. See '885 Pat., 10:12-19; see also id., 10:4-6; 10:36-42; Ex. R, ¶47.

Fourth, in the discussion at 8:52 – 9:19, the '885 Patent discloses four different examples of “zone scenes” in a given system that have overlapping members:

- a first “zone scene” named “Morning” that comprises a predefined group of the Bedroom, Den, and Dining Room “zone players”;
- a second “zone scene” named “Evening” that also comprises one predefined group of the Bedroom, Den, and Dining Room “zone players” (as well as another predefined group of the Garage and Garden “zone players”);
- a third “zone scene” comprising one predefined group of “zone players” located “upstairs” and another predefined group of “zone players” located “downstairs” (at least one of which would include the Bedroom, Den, and/or Dining Room players); and
- a fourth “zone scene” that comprises a predefined group of “all zones” in the system, including the Bedroom, Den, and Dining Room “zone players.” See also Ex. R, ¶48.

Fifth, the '885 Patent discloses that “various scenes may be saved in any of the [zone player] members in a group” – which conveys to a POSITA that each “zone player” can be included in multiple different “zone scenes” in existence at the same time. '885 Pat., 2:56-59; Ex. R, ¶49.

720. I disagree with Sonos’s arguments. First, the disclosure from the specification that a user may “go back . . . to configure another [zone] scene if desired” does not indicate that a zone player is a member of multiple zone scenes. Second, any disclosure that “multiple different “zone scenes” have been set up and are in existence at the same time” likewise fails to disclose that any zone player is a member of more than one zone scene. Third, Sonos argues that “when a user is

Contains Highly Confidential AEO and Source Code Materials

selecting which ‘zone players to add during setup of each ‘zone scene,’ the user is presented with ‘ALL the zones in the system, including the zones that are already grouped,’” but this does not disclose a zone player as a member of multiple zone scenes either. While all of the options for zone players to add may be shown, this portion of the specification does not indicate that a zone player already a member of a zone scene would *continue* to be a member of the zone scene if it was selected for a new zone scene. Fourth, the examples given therein do not disclose a zone player that was currently a member of multiple zone scenes; rather, they simply disclose that there are different options for configuring zone scenes, potentially at different times or in different households. Fifth, although the specification discloses that “various scenes may be saved in any of the members in a group,” this does not indicate that different scenes are stored in a single member of a group at the same time, nor that the zone player is a member of each of those different scenes, which may instead comprise zone player members that are not the zone player storing the zone scenes. Finally, to the extent that Sonos intends to rely on “the scenario discussed at 2:5-12, [where] a user could first set up three different “zone scenes” for the morning, evening, and weekend,” this does not disclose simultaneous zone scenes because the zone scenes are named morning, evening, and weekend, indicating that the specification intended to disclose zone scenes for different (non-overlapping) times of day and the week.

721. Next, Sonos argues that there is support for the particular claimed order of operation, and makes four arguments in support:

First, a POSITA would understand that the claimed “standalone mode in which the first zone player is configured to play back media individually” refers to a “zone player” operating in a non-grouped state in which it is configured to play back audio on its own, rather than as part of a group for synchronous playback. See Ex. R, ¶53. As explained above, the ’885 Patent clearly discloses that “zone players” are capable of operating in such a “standalone mode.” Supra II.B.i.; ’885 Pat., 4:44-5:2, 5:21-6:27, 6:39-43; Ex. R, ¶39, 53.

Contains Highly Confidential AEO and Source Code Materials

Second, as explained in response to Google’s first § 112 argument, the ’885 Patent does disclose that a “zone player” can be added to multiple different “zone scenes.” Supra II.B.ii.

Third, the ’885 Patent discloses that a “zone scene” is a group of “zone players” that is “predefined” and “saved” for future use during a “setup” phase, but is not activated for synchronous playback at that time. Supra II.B.i; ’885 Pat., 8:45-51, 10:4-19, 10:36-52, 11:12-19; D.I. 249-11, 1-2, 9-16; Ex. R, ¶55. Rather, the predefined group of “zone players” initially exists in an inactive state, which is what the ’885 Patent explains when distinguishing a “zone scene” from an ad-hoc group that is automatically activated at the time it is formed rather than being predefined and saved for future use. Id. In this respect, the ’885 Patent discloses that, unlike for an ad-hoc group, the act of adding “zone players” to a “zone scene” does not cause those “zone players” to become linked together for synchronous playback at that time. Ex. R, ¶53. This conveys to a POSITA that a “zone player” operating in “standalone mode” prior to being added to each new “zone scene” will continue to operate in “standalone mode” after being added to each new “zone scene.” Id.

Fourth, the ’885 Patent discloses that the subsequent act of “invoking” a “zone scene” is what activates the “zone scene” for synchronous playback by causing the “zone players” in the invoked “zone scene” to become configured to play audio in synchrony in accordance with a given “zone scene.” Supra II.B.i; ’885 Pat., 9:16-20, 10:53-63; Ex. R, ¶56.

722. I disagree with Sonos’s arguments. First, Sonos argues that the specification “clearly” discloses speakers playing back media in standalone mode, but the portions of the specification cited—’885 Pat., 4:44-5:2, 5:21-6:27, 6:39-43—do not clearly disclose such a standalone mode. Second, I already addressed above that the patent does not disclose adding a zone player to multiple zone scenes. Third, Sonos argues that the specification discloses having “zone players” initially exist in an inactive state, but this is not disclosed in the specification. See ’885 Pat., 8:45-51, 10:4-19, 10:36-52, 11:12-19. Those portions of the specification instead disclose ordinary usage of a zone player rather than different “states.” Further, the specification never distinguishes “zone scenes” from “ad hoc groups” by stating that the “ad hoc group” is automatically activated at the time it is formed. Rather, the specification teaches that ad hoc groups may need to be re-formed over time. Sonos concludes that a POSITA would understand based on these portions of the specification that zone players in standalone mode would continue operating

Contains Highly Confidential AEO and Source Code Materials

in standalone mode after being added to a new zone scene, but Sonos cites no direct evidence of this, and instead makes this conclusion from a set of incorrect interpretations of irrelevant portions of the specification. Fourth, Sonos argues that “invoking” a zone scene causes the zone scene to become configured to play audio in synchrony, but this does not disclose that a zone player continues in standalone mode after being added to a group either. Rather, the zone player may have been stopped and then later invoked to play back the different audio in synchrony.

XII. NON-INFRINGEMENT ALTERNATIVES

723. As I will explain (in what I expect will be my forthcoming report on non-infringement), Google’s products do not infringe the ’885 patent. It is thus my opinion that the accused Google products are themselves non-infringing alternatives to Claim 1 of the ’885 patent.

724. Additionally, I understand that Sonos contends that for Claim 1 of the ’885 patent, the date of first infringement in this case is November 24, 2020, the date on which the ’885 patent issued. Based on my current understanding of Sonos’s infringement contentions and my review of the evidence in this case, including documents, deposition testimony and source code, it is my opinion that additional non-infringing alternatives were available at the time of the alleged first infringement (and are still available today).

725. I discuss one of these non-infringing alternatives below. I reserve the right to update, amend, or supplement my opinions based on further evidence offered by the parties or located based on my investigation, opinions proffered by Sonos’s experts, or arguments raised by counsel.

726. I describe an Alternative, an implementation in which when the accused “standalone” speaker is added to a target group, it matches the music (or silence) of the target group. The Alternative is a non-infringing alternative for the Accused Instrumentalities to the alleged invention claimed in Claim 1 of the ’885 patent.

Contains Highly Confidential AEO and Source Code Materials

experience the time-synchronized delivery of media content. *See, e.g.*, '694 patent at Abstract, 10:21-29. Both patents also reference similar hardware such as playback devices and processors as well. *See, e.g.*, '885 patent at 5:21-39, 6:28-48, and '694 patent at 4:31-65, Fig. 1.

XVI. RESERVATION OF RIGHTS

755. In the event I am called upon to testify as an expert witness in this case, I may also discuss my own work, teaching, and publications in the field, and knowledge of the state of the art in the relevant time period. I may rely on handbooks, textbooks, technical literature, my own personal experience in the field, and other relevant materials or information to demonstrate the state of the art in the relevant period and the evolution of relevant technologies. I also reserve the right to rely on demonstrative exhibits to help explain the opinions set forth in this report.

756. I reserve the right to modify or supplement my opinions, as well as the basis for my opinions, in light of new positions set forth by Sonos, to the extent Sonos is permitted to advance those positions. This includes positions concerning the scope and interpretation of the asserted claim, infringement allegations, conception, diligence, and reduction to practice, and secondary considerations. It is also my understanding that Sonos may submit an expert report corresponding to this Report. I reserve the right to rebut any positions taken in that report.

I, Dan Schonfeld, declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

DATED: June 22, 2022

A handwritten signature in black ink that reads "Dan Schonfeld". The signature is written in a cursive style with a large, looped "O" at the end.

Dan Schonfeld, Ph.D